CCX-15
CCX-17
CCX-19
(Temporary for CCI-15, CCI-17 & CCI-19)

Rugged Military Grade
1U Rack Mount
LCD Keyboard Console

15” XGA TRANSFLECTIVE LCD
17” or 19” SXGA LCD

Technical Reference

22002400X4
Revision Preliminary X4
11/3//09

Warranty

The product is warranted against material and manufacturing defects for two years from date of delivery. Buyer agrees that if this product proves defective Chassis Plans' is only obligated to repair, replace or refund the purchase price of this product at Chassis Plans' discretion. The warranty is void if the product has been subjected to alteration, neglect, misuse or abuse; if any repairs have been attempted by anyone other than Chassis Plans; or if failure is caused by accident, acts of God, or her causes beyond the control of Chassis Plans. Chassis Plans reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

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Products returned for repair must be accompanied by a Return Material Authorization (RMA) number, obtained from Chassis Plans prior to return. Freight on all returned items must be prepaid by the customer, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned from Chassis Plans via Ground, unless prior arrangements are made by the customer for an alternative shipping method

To obtain an RMA number, call us at 858-571-4330. We will need the following information:

Return company address and contact
Model name and model # from the label on the back of the display
Serial number from the label on the back of the display
Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report for each board and return the product(s) to our San Diego, CA facility:

Chassis Plans.
8295 Aero Place
Suite 200
San Diego, CA 92123
Attn: Repair Department

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Chapter 1 - Introduction

Description

The CCX-15, -17 and –19 are military grade high performance 1U clamshell LCD keyboard drawers offering 15-inch, 17-inch and 19-inch TFT LCD displays and sealed NEMA-4 keyboards. The CCX family is designed to meet Mil-Std 901D and 810F and includes a solid milled aluminum front panel, lightweight 5052-H32 aluminum construction and locking stainless hardware throughout. The drawer is held closed by two captive thumb screws. Lock out friction slides are included. Friction slides assure the drawer stays where put for ease of use in the back of a moving vehicle. The CCX is ideal for mounting in a transit case for adverse environments that would destroy lesser displays.

The 15-inch display offers 1024x768 resolution, transflective TFT technology and an LED backlight. The other two models offer either 17-inch or 19-inch LCDs with CCFL backlights. All other features of the systems are identical including dimensions, keyboards, input signal options, LCD controllers, and optional KVMs. The 15-inch display offers 560nit brightness, 700:1 native contrast and 80 deg viewing angle. The 17-inch display offers 380nit brightness, 1000:1 native contrast, and 80 degree viewing angle. The 19-inch display offers 300nit brightness, 1300:1 native contrast, and 89 degree viewing angle for exceptional viewability.

The displays are provided with 1.1mm soda lime glass with an ITO conductive EMI filter and an additional 1.1mm soda lime glass overlay with sputtered anti-reflective (AR) coating. Both pieces of glass are optically bonded to each other and to the front of the display for superior viewing and ruggedness. A 3mm copper bus bar around the entire glass stack-up provides grounding. The contrast is enhanced to approximately 1300:1 for the displays with this ITO/Anti Reflective glass stack-up.

The Aspect Ratio for the 15-inch display is 4:3 and for the 17- and 19-inch displays is 5:4. The Pixel Pitch for the 15-inch display is .297x.297mm, for the 17-inch display is .264 x .264mm and for the 19-inch display is .294 x .294mm. The displays offer 16.7 million colors (True Color). The displays provide multiple signal input options including aRGB, DVI-D, DVI-I, NTSC, S-Video and Composite Video, depending on the controller.

The displays offer a choice of high quality advanced scaling controllers with a Genesis chipset. The HE-1400 controller offers DVI-D and VGA (aRGB) inputs. The HE-1600 offers DVI-I, VGA (aRGB), NTSC, S-Video and CVS with an option for Component (YCbCr) input. The HE-1920 offers DVI-D, VGA (aRGB), NTSC, S-Video and CVS with an option for Component (YCbCr) input. In addition, the HE-1920 supports Picture-In-Picture (PIP). These are specifically ruggedized controllers offering as standard conformal coating with high shock/vibration and temperature extreme tolerances as well as long life product availability for assured delivery throughout multi-year programs.

With only 24.4-inches of installed depth, the CCX-15, CCX-17 and CCX-19 are perfect for rack or transit case installations. Adapters are provided for mounting in up to 37-inch deep racks. They are primarily designed for rugged Military applications but can be used in Industrial, Commercial, or Broadcast applications where reliability and quality preclude the use of cheaply made imported units. A cable management arm is included. Without the cable management arm, the length is only 22-inches.

The keyboard is a 113 key NEMA-4 rated sealed silicone rubber keyboard with tactile feedback and full travel for comfortable typing. Carbon on gold contacts assure reliable operation. The keyboard is rated for 10 million lifecycles per switch. A sealed hall effect pointing device is included in the keyboard along with 3 “mouse” buttons. Both PS/2 and USB outputs are standard. A wrist pad is included. The keyboard is completely sealed to meet IP-65 / NEMA 4 to prevent liquid penetration so coffee and Coke spills don’t faze it.

Ruggedized 4- and 8-port DVI and VGA KVMs are available with up-front port selection and LED display.

As with all Chassis Plans products, a wide variety of custom options can be configured per customer or application specific requirements. Contact your Sales Engineer to discuss your particular requirements.

LCD Enhancements

Chassis Plans starts with Grade A Industrial Quality LCD panels selected for optical performance, high reliability and long product life cycle. In order to not only ruggedize the LCD, but to also enhance the mechanical, optical and EMI properties of the finished unit Chassis Plans optically bonds 2 layers of coated 1.1 mm soda-lime float glass to the front of the LCD panel. The first layer is coated with an Indium Tin Oxide (ITO) coating with a surface resistivity of <13.5 ohms/sq. See Figure 1 for attenuation values.

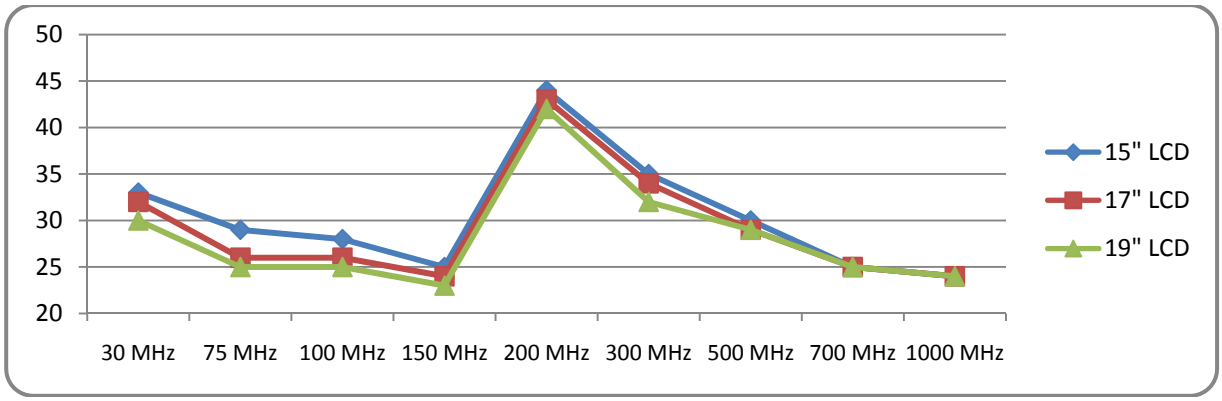


Figure 1 – EMI Shielding Effectiveness of ITO Coating

There is a Copper conductive buss bar that wraps around the edge of the glass to facilitate conduction from the ITO coating to the front surface of the laminated structure to make a complete electrical shield around the face of the LCD. See Figure 2 for details.

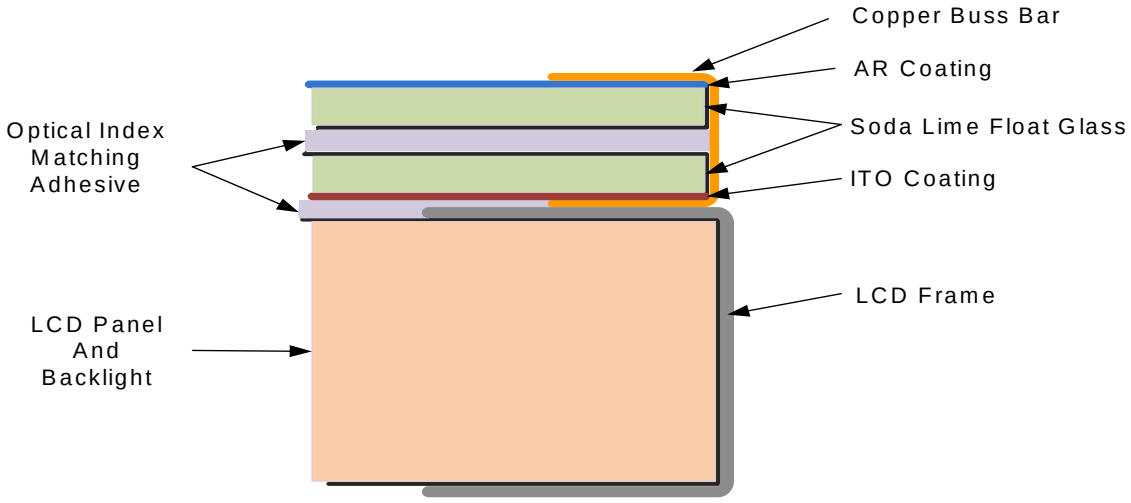


Figure 2 – Optical Stack on LCD

The second layer of glass is coated with an Anti-Reflective (AR) coating which matches the index of refraction of air to eliminate surface reflections. These layers of coated glass are bonded together with an index matching optical adhesive to eliminate internal reflections caused by the index of refraction mismatch between the soda lime glass and air. This eliminates over 95% of unwanted glare from the screen. Please see Figure 3 below for more details.

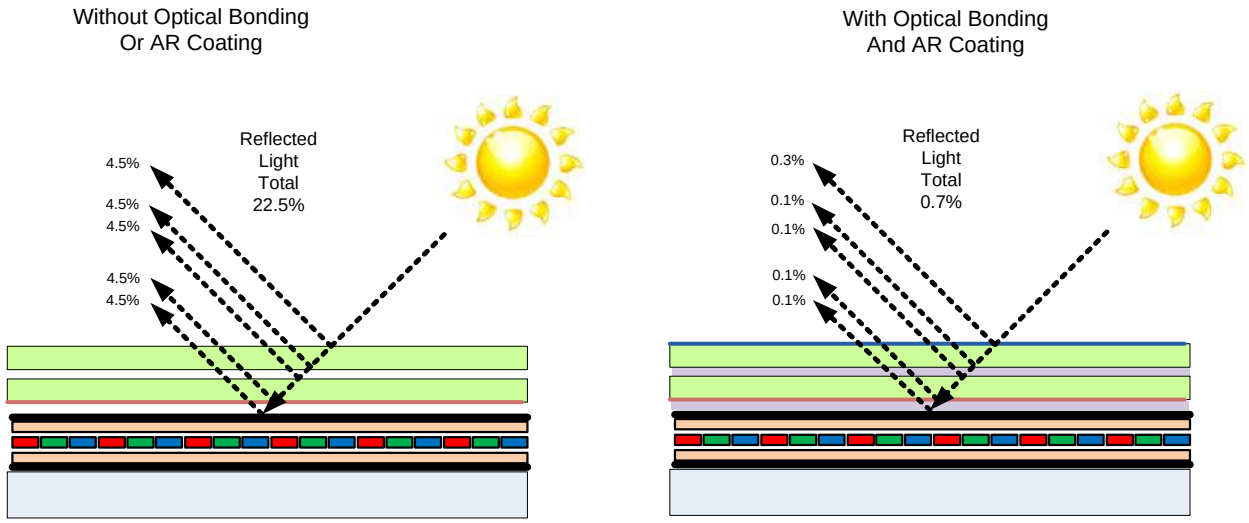


Figure 3 – Comparison of Reflections with and without Optical Bonding

The resulting structure has greatly enhanced optical characteristics in high ambient light conditions. The optical adhesive used is a silicone RTV and offers other benefits mechanically to the LCD as well. The adhesive remains pliable and therefore acts as a shock absorbing medium for the front of the LCD. Together with the additional layers of glass provides a very rugged composite structure. Another benefit is that should breakage actually occur the shards of glass will be retained together to prevent injury to personnel. The adhesive also prevents any condensation from building up in the air gap between the layers of glass which would cause fogging of the display. Finally, the added mass bonded to the front of the LCD display adds a thermal conduction path to help dissipate the heat generated in the backlights themselves.

By eliminating the majority of reflected light, the apparent contrast improves making the display more readable in high bright situations. An alternative to improving the contrast is to increase the back light levels to overpower the reflected light. The downside to this approach is the higher power requirements and higher heat generated by the backlights.

Photo Courtesy of
GDS Clearview

Figure 4 – Comparison with and without Optical Bonding

Genesis Based LCD Controllers

The LCD Controller is a key component in any display system and no expense has been spared in specifying the HE-1400, HE-1600 and HE-1920 Genesis controllers. These are long life revision controlled military grade components. The Genesis chip set is the current gold standard for LCD controllers. The controllers support 3x8-bit 16.7 million colors at up to 1600x1200 (HE-1920 Controller) scaled to 1280x1024 native panel resolution. Refresh rates of 60Hz for UXGA and SXGA with higher refresh rates for lower resolutions available. Computer input signals of VGA, SVGA, XGA, SXGA, WXGA and UXGA are supported. Video inputs of NTSC, PAL and SECAM are optionally available. DVI inputs supports up to 1600x1200 60Hz signals. These ruggedized military grade controllers are rated for operating at -40 to +80 deg C, use low mass tantalum capacitors for maximum vibration and shock tolerance and are conformal coated for extreme ruggedness. The coating is silicone resin conformal coating.(MOD) DEF-STAN 59/47 Issue 4 &UL QMJU2 compliant

MTBF for the controllers is in excess of 150,000 to 200,000 hours.

The HE-1400 and HE-1920 controllers provide up scaling while the HE-1600 provides up and down scaling. This allows input scaling of virtually any input signal to scale the image to the 1280x1024 native LCD panel resolution. They provide for PC, Apple and Sun input resolutions.

The HE-1400 and HE-1920 provide DVI-D inputs while the HE-1600 provides DVI-I input.

Friction Slides

Rugged General Devices friction slides have been specified. Ball bearing slides are a weak point in any rackmount keyboard design and the use of friction slides negates those problems. Using friction slides allows the keyboard to stay at the position you place it without the use of troublesome lock-outs. Friction slides also have a very high tolerance for dust and dirt that typically destroys ball bearing slides in very short order.

Ultra high quality milled aluminum Jonathon slides are optionally available as specified.

Included in the kit are rack adapter brackets allowing installation into racks from 24- to 36-inch depth. Also included is all required hardware to install the keyboard assembly into a rack. Cage nuts are also supplied.

Photos

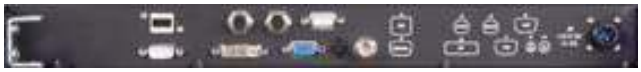
Front View - Open

Front View

Rear View

Top View of Keyboard Area (no KVM)

Rear View
HE-1400 Controller I/O



Rear View
HE-1600 & HE1920 Controller I/O

NEMA-4 / IP65 Keyboard

Specifications

Enclosure
- 1U (1.71") x 24.4" deep
- Front Panel milled 5052 aluminum alloy
- Body made of 5052-H32 aluminum alloy
- All stainless steel hardware
- All self locking pressed in fasteners where appropriate
- Powder coat black, medium texture, for ruggedness Other colors optionally available
- Designed to Mil-Spec Standards to Satisfy Military, Industrial and Commercial Requirements
- Compact Enclosure for Limited Depth Installation
- Weight: 35lbs (w/o KVM)
  38lbs (w/ KVM)

17" Display
- 17" TFT LCD 1280x1024
- 1.1mm soda lime glass ITO filter bonded to display
- 1.1mm soda lime glass AR filter bonded to ITO filter
- Display Colors: 16.7 Million
- Response Time: 16mS Typical
- Viewing Angle: 80 deg
- Contrast Ratio: 1000:1 typical native
  1300:1 w/ bonded AR filter
- Brightness: 380cd/m2 typical
- Pixel Pitch: 0.264mm x 0.264mm
- Pixel Arrangement: R.G.B Stripe
- Power Management: EPA Energy Star, VESA DPMS
- Operating Temperature: 0 to + 50 Deg C
- Storage Temperature: -10 to +60 Deg C

19" Display
- 19" TFT LCD 1280x1024
- 1.1mm soda lime glass ITO filter bonded to display
- 1.1mm soda lime glass AR filter bonded to ITO filter
- Display Colors: 16.7 Million
- Response Time: 8mS
- Viewing Angle: 89 deg
- Contrast Ratio: 1300:1 typical native
  1800:1 w/ bonded AR filter
- Brightness: 300cd/m2 typical
- Pixel Pitch: 0.297mm x 0.297mm
- Pixel Arrangement: R.G.B. Stripe
- Power Management: EPA Energy Star, VESA DPMS
- Operating Temperature: 0 to + 50 Deg C
- Storage Temperature: -10 to +60 Deg C

KEYBOARD
- Sealed silicone rubber keyboard
- 113 Keys
- 20 Function keys
- Integrated numeric pad
- High quality carbon-on-gold contacts
- Protection to NEMA 4 / IP65 dust & splash proof (coffee proof!)
- Universal PS/2/USB Connection
- Tactile Keystroke
- 10,000,000 lifecycles per switch

POINTING DEVICE
- Incorporated pointing device (mousebutton) for precise tracking
- 3 Mouse buttons
- Built in to silicone rubber keyboard
- Hall sensor motion detection
- Universal USB & PS/2 interface

OPTIONAL FEATURES / OPTIONS
- Integrated KVM Switch Options
- Transflective LCD for Daylight Use
- Enhanced Backlighting
- Protective Glare and NVis Filters
- Customer Specified Paint Color
- Customer Logo
- Custom sheet metal and mechanical features

POWER SUPPLY OPTIONS

AC Input
- 100 to 260VAC, auto selecting
- 47-66 HZ

12VDC Input Transient Filter
- Line transient protection for 12VDC vehicular applications

Mil-Std-1275A DC/DC Converter
- True 1275 compliance for military 28VDC nominal vehicle inputs
- 18 to 36VDC input

48VDC DC/DC Converter
- 36 to 75VDC Input
- Isolated Inputs for +/- input levels

See the appropriate power supply section for complete power supply specifications.

Table 1 – Specifications

HE-1400 DVI-D/VGA Input Features:

Inputs:

Analog RGB:	60Hz at SXGA, WXGA, XGA, SVGA, VGA With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~SXGA interlaced & noninterlaced.
DVI-D:	60Hz at SXGA, WXGA, XGA, SVGA, VGA
Image Scaling:	Up / down scaling to fit input to panel resolution.
Image Control:	Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.
Other Features:	Auto picture setup, Auto RGB calibration, Auto source seek, OSD timeout, OSD position, Input source select, OSD menu lock, Direct key for brightness level adjustment.

HE-1600 Multi-input features

Inputs:

Analog RGB:	60Hz @ UXGA 75Hz @ SXGA, WXGA, SVGA, VGA 1152 x 900 @ 66Hz (SUN) 1152 x 900 @ 76Hz (SUN) 1280 x 1024 @ 76Hz (SUN) With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~USXGA interlaced & non-interlaced.
DVI-I:	60Hz @ UXGA 75Hz @ SXGA, WXGA, XGA, SVGA, VGA
Video:	NTSC / PAL / SECAM (Interlaced) Composite Video,S-Video Component (YCbCr) (Optional)
Image Scaling:	Up / down scaling to fit input to panel resolution.
Image Control:	Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.
Other Features:	Auto Picture Setup, Auto Color Gain, Auto Power, OSD Timeout Position and Transparency, Hot Keys, Auto Source Seek.

HE-1920 Multi- Input Features:

Inputs:

Analog RGB:	60Hz @ UXGA 75Hz @ SXGA, WXGA, SVGA, VGA 1152 x 900 @ 66Hz (SUN) 1152 x 900 @ 76Hz (SUN) 1280 x 1024 @ 76Hz (SUN) With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~UXGA interlaced & non-interlaced.
DVI-I:	60Hz @ WUXGA 60Hz @ UXGA 75Hz @ SXGA, WXGA, XGA, SVGA, VGA
Video:	NTSC / PAL / SECAM (Interlaced) Composite Video S-Video RGB Video SD Component (YCbCr) (Optional)
Image Scaling:	Up scaling to fit input to panel resolution.

HE-1920 Features – Continued:

Image Control:	Auto configuration, Brightness, Contrast, Clock, Phase, Color temperature, Image position, Saturation, Hue, Gamma.
Other Features:	System Information, OSD position, Scaling to fill screen and fill to aspect ratio, OSD timeout, Factory reset, OSD menu transparency, Horizontal & Vertical image inversion, Picture in Picture.

Table 2 – Genesis Video Controllers Specifications

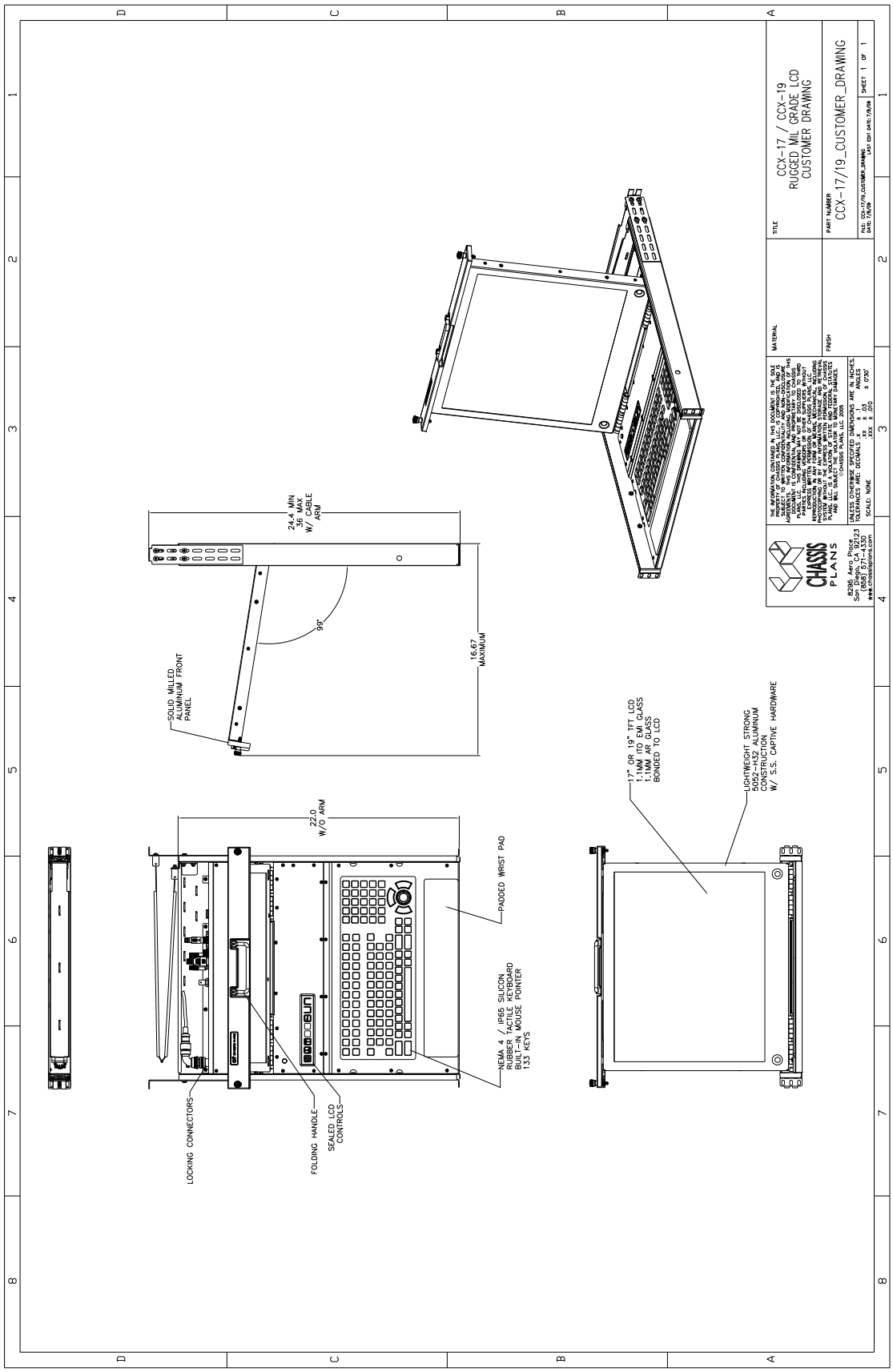


Figure 5 - CCX Outline Drawing

Chapter 2 – KVM Options

KVM Options

The CCX-17 and CCX-19 are designed to interface with optional KVM modules. These KVMs allow the one keyboard/display to control four DVI-D, four VGA ports or eight VGA ports, depending on the KVM model. The display is provided with push button controls above the keyboard for port selection and port active LED indication.

Chassis Plans offers the unified KVMX product line as ruggedized rackmount KVMs. These are high quality KVMs mounted in 5052-H32 aluminum enclosures. The CCX keyboard family includes special circuitry to interface with these KVMs to provide front panel switch and port active LED indication. They can also be used standalone with any keyboard and video monitor using keyboard hot-key combinations to select the active port. The KVMX-4VGA and KVMX-8VGA also provide OSD control.

Photo 1- KVMX Rackmount KVMs

The rack ears are designed to provide several mounting options allowing maximum flexibility in installing in a variety of racks or transit cases.

Note: These KVMs may offer audio ports, depending on the model. The CCX family of LCD display consoles do not provide speaker output or microphone input.

Note: The CCX-17 and CCX-19 must be ordered with the KVM option to provide the control membrane switch and associated circuitry. A standard CCX-17 or CCX-19 will work with these KVMs using the keyboard hot-key commands. Retrofit of a non-KVM CCX keyboard console is possible though it requires the unit be returned to the factory for that work. Please contact your Sales Engineer for additional details.

KVMX-4DVI

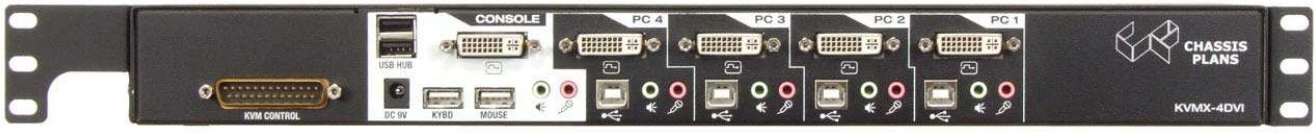


Photo 2 - KVMX-4DVI Rear View

The KVMX-4DVI provides four ports of DVI-I and USB 2.0 connection to the CXX family LCD display consoles. In addition, each port is provided with speaker out and microphone/audio input. A 2-port USB 2.0 Hub is included for connecting additional devices. The KVM supports USB PC's, Mac G3/G4, iMac and Sun. Hot plugging is provided so devices can be connected or disconnected while other devices are in use. Control is via either the front panel push buttons or via Hotkey keystroke combinations. Auto scanning is also provided. Power is provided by the USB connection to a connected computer so external power is not normally required though it can be provided for unusual USB configurations or power requirements. A 6-foot cable set is provided for connection to one computer. Other cables and lengths are optionally available.

KVMX-4VGA

Photo 3 - KVMX-4VGA Rear View - Preliminary

The KVMX-4VGA is a simple VGA only KVM providing four ports of VGA interface with PS/2 or USB connectivity. Port selection is via the front panel push buttons (membrane switch) with port selected LED indication, OSD menu (On Screen Display) or Hot Key switching. Secure access can be configured with password protection. Programmable autoscan is provided. A single 6-foot 3-in-1 cable for connecting to one computer's VGA port and keyboard/mouse (via PS/2 or USB) is provided. Additional cables and length options are available. Power is provided by the CCX keyboard assembly and a separate AC power brick providing +9VDC is provided for stand-alone operation.

KVMX-8VGA

Photo 4 - KVMX-8VGA Rear View

The KVMX-8VGA is identical to the KVMX-4VGA except in providing 8 ports.

Chapter 3 – Power Supply Options

AC Input Power Supply

The AC Input Power Supply is a 65W Medical Grade “Brick” style power supply. The output is provided with a circular mil connector for connecting to the LCD Keyboard Drawer. The input accepts a standard IEC 320 plug. A bracket is provided to securely mount the supply in a rack.

Alternate AC supplies are available as required by the application or environmental requirements.

INPUT		**ENVIRONMENTAL**	
Voltage	100-240VAC	Operating Temperature	0 to 50°C
Current	2.0A @ 100VAC	Storage Temperature	-40 to +85°C
Frequency	50-60Hz		
Input Connector	3-Pin IEC 320 Receptacle	**SAFETY**	
		cTUVus	
OUTPUT		UL 60601-1	
Total Regulation	< +/- 5%	CSA C22.2 No. 601.1-M90	
Set Point Accuracy	< +/- 3% @ 60% Load	CB per IEC 60601-1	
Hold-up Time	>12mS @ Full Load, 115VAC	CE marked to LVD	
		Class I	
Over Voltage Protection	Built-in		
Over Current Protection	Built-in	**EMI/EMC**	
Short Circuit Protection	Pulsing mode, auto recovery	Emissions	CISPR11 and FCC Part 15, Class B EN61000-3-2, -3
		Immunity	EN61000-4-2, -3, -4, -5, -6, -9, -11
SIZE			
L X W X H	5.07” X 3.06” X 1.35”		
Weight	1.2 lbs		

Table 3 - AC Input Supply Specifications

Photo 5 - AC Power Supply

12VDC Input Transient Filter

The CCX family display consoles require nominal +12VDC at 40W for operation. An EMI line filter is provided to limit EMI emissions and to provide a small measure of input filtering.

For operation from unregulated 12VDC (+/-10%) such as in a vehicular or marine environment, front end transient filtering is required to suppress potentially damaging spikes from large inductive loads in the DC circuit (starters, etc.).

The xxx 12VDC Input Transient Filter provides an input Transient Protection as well as inductive and capacitive filtering to suppress large input transients. A bridge rectifier provides reverse connection protection. A circuit breaker provides for failure protection and allows the power to be disconnected.

Connectors

Input Connector	MS3102A-10SL-3P (MIL-C-5015)
Mating Input Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Input Pin C – N/C
Output Connector	MS3102A-10SL-3S (MIL-C-5015)
Mating Output Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Pin C – N/C

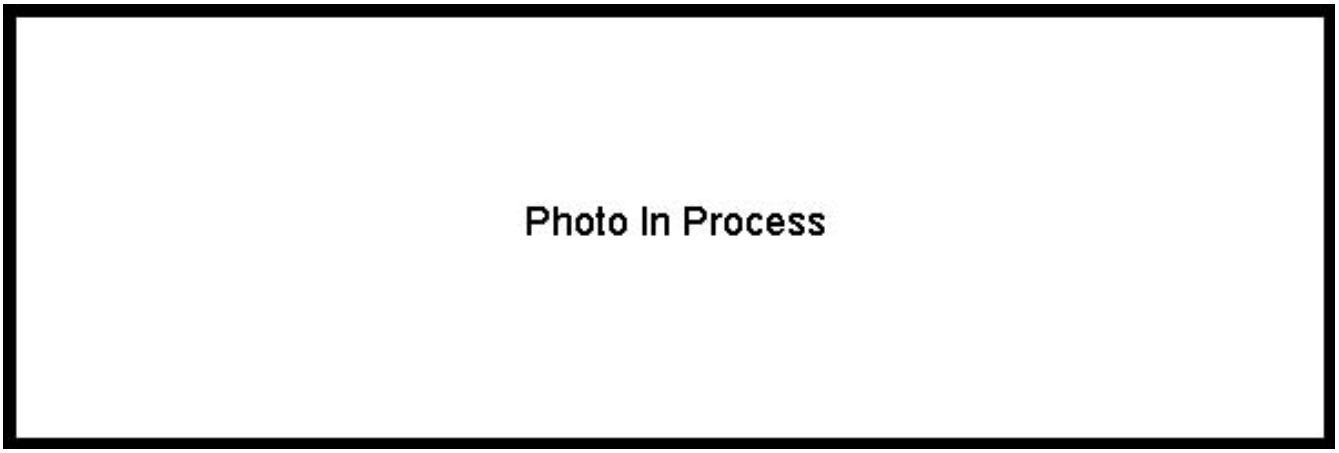


Photo 6 - 12VDC Input Front End Filter

MIL-STD-704/1275 DC Input Converter

The xx Mil-Std-704/1275 DC Input Converter provides true 704/1275 input specifications allowing reliable operation from nominal 28VDC input mains in a military environment. Amil grade DC to DC Converter is provided in a rack mountable case with military grade circular connectors. This supply meets Mil-Std-704A and Mil-Std-1275A (100V for 50mS).

Operating Specifications	
Input Voltage	18-36VDC
Output Voltage	12.0VDC
Output Current	5A
Output Power	75W
Electrical Specifications	
Efficiency	81%
Isolation	200VDC, Input to Output and Input to Case
EMI Filtering	Mil-Std-461E, CD101 and CE102 on the input
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Connectors	
Input Connector	MS3102A-10SL-4P (MIL-C-5015)
Mating Input Connector	MS3106A-10SL-4S (Straight) MS3108A-10SL-4S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Pin C –N/C
Output Connector	MS3102A-10SL-3S (MIL-C-5015)
Mating Output Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)
Pinouts	Pin A – Positive Pin B – Negative Pin C– N/C

Environmental Specifications	
Pressure-Altitude	Per MIL-STD-810F, Method 500.4, Procedure I and II
High Temperature	Per MIL-STD-810F, Method 501.4, Procedure I and II
Low Temperature	Per MIL-STD-810F, Method 502.4, Procedure I
Humidity	Per MIL-STD-810F, Method 507.4, Procedure I
Fungus	Per Mil-Std-810F, Method 508.5, Procedure I
Salt Fog	Per Mil-Std-810F, Method 509.4, Procedure I
Sand and Dust	Per Mil-Std-810F, Method 510.4, Procedure I and II
Explosive Atmosphere	Per Mil-Std-810F, Method 511.4, Procedure I
Acceleration	Per MIL-STD-810F, Method 513.5, Procedure I and II
Vibration	Per MIL-STD-810F, Method 514.5, Procedure I, Category 1, 4, 7 thru 14 and 16 thru 21
Shock	Per MIL-STD-810F, Method 516.5, Procedure I, IV

Table 4 - MIL-STD-704 Power Supply Specifications

Photo 7 - Mil-Std-704 Power Supply

+/-48VDC Power Supply

The xx 48VDC Input Converter provides universal isolated 48VDC input, either positive or negative input. Thus it can be used in a data center with centralized power of +48VDC as well as a central office with -48VDC mains. The system is provided in a rack mountable case with military grade circular connectors.

Operating Specifications		**Electrical Specifications**	
Input Voltage	36-75VDC	Efficiency	92%
Output Voltage	12.0VDC	Isolation	1500VDC, Input to Output and Input to Case
Output Current	10A		
Output Power	120W	EMI Filtering	Mil-Std-461E, CD101 and CE102 on the input
Connectors		Operating Temperature	-40°C to +85°C
Input Connector	MS3102A-14SL-7P (MIL-C-5015)	Storage Temperature	-55°C to +125°C
Mating Input Connector	MS3106A-14S-7S (Straight) MS3108A-14S-7S (Right Angle)		
Pinouts	Pin A - Positive Pin B – Negative		
Output Connector	MS3102A-10SL-3S (MIL-C-5015)		
Mating Output Connector	MS3106A-10SL-3S (Straight) MS3108A-10SL-3S (Right Angle)		
Pinouts	Pin A – Positive Pin B – Negative Pin C– N/C		

Table 5- 48VDC Power Supply Specifications

Photo 8- 48VDC Power Supply

Chapter 4 – Ordering Information

Part Number Matrix

CCX-15[**V**][**P[K**] (w/ 15” LCD)
CCX-17[**V**][**P[K**] (w/ 17” LCD)
CCX-19[**V**][**P**][**K**] (w/ 19” LCD)

(V) Video Controller Option
A – HE1920 Multi Feature Multi Input
B – HE1600 Multi Input
D – HE1400 DVI/VGA Input

(P) Power Supply Option
N – No supply provided. Operates from nominal 12VDC +/-5%
A – AC input, universal 100-260VAC, 50/60Hz
B – 12VDC Front End Transient Filter
C – 28VDC Mil-Std-704 Military Grade
D – +/-48VDC, Vicor Module Military Grade

(K) KVM Option
N – None
A – 4 Port VGA / PS/2
B – 8 Port VGA / PS/2
C – 4 Port DVI / USB

Example Part Numbers

CCX-19CBC – 19” display with HE1400 Controller, 12VDC input power filter, 4-Port DVI KVM.

CCX-19BAN – 19” display with HE-1600 Controller, AC input power supply, no KVM.

Chapter 5 - Installation

Package Contents

Part Description	Quanty
LCD Keyboard Assembly	1
Power Supply	1 (if P/S spec'd in part number)
Power Supply Rack Bracket	1 (if P/S spec'd in part number)
Rack Ruler	1
Rack Slide Hardware Kit (General Devices)	1
Cable Tie, 7-9/16" Long	8
Velcro Tie, Black	6
Cage Nuts	8
Manual, LCD User, CD	1
Manual, LCD Quick Start Guide	1
Checklist	1
DVI Cable, 6-Foot	1
VGA Cable, 6-Foot	1
USB A-A Cable, 6-Foot	1

Table 6 - Package Contents

Notes:

1. **Power Cord Kit** – For the AC input supplies, a standard 6-foot North American IEC-320 power cord is provided. For the DC input supplies, a kit is provided with a mating Mil Circular connector, backshell, and pins allowing the user to fabricate an appropriate cable for the intended application. For volume orders, Chassis Plans can provide pre-fabricated power cables per the end use specifications.

2. **Wrist Pad** – A 1/8" Neoprene wrist pad with a fabric cover is provided loose. We have found some customers want the pads and others do not so we ship it loose. To install, simply peel the backing off the adhesive and press into place. *Caution – do not cover the screws for the keyboard panel.*

Rack Installation

To mount the CCX-17 / CCX-19 in a rack, it is first important you identify the correct holes to mount to. Please see the following illustration. Note that a 'U' starts between the holes that are ½" apart. One very common problem is trying to install into the wrong holes.

Because there are multiple styles of racks, it is not possible to provide detailed instructions on mounting the equipment. However, there are general instructions at http://www.chassis-plans.com/PDF/Rack_Slide_Use.pdf for rack installation which should help.

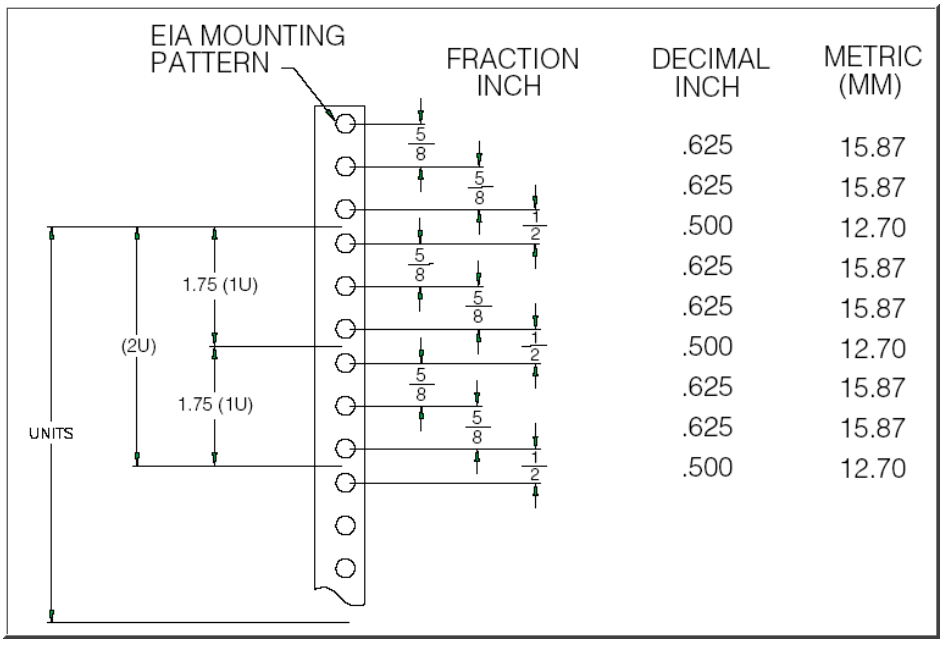


Figure 6 - Rack Mounting Hole Spacing

Chassis Plans offer free Rack Rulers to assist in installing equipment into racks. You should have received one with your order. To request more, fill out the short form at http://www.chassis-plans.com/form_rack_ruler.html and we'll send you as many as you want. These are invaluable for installing systems into racks.

Connecting the Display

The CCX-17 / CCX-19 provide for three controllers with rear panel details provided below.

HE-1400 Controller Rear Panel Connections

The HE-1400 provides for DVI and VGA inputs. In addition, the rear of the display provides for Keyboard and Pointing Device outputs plus a Circular Mil connector for power connection. If you have purchased a KVM option, then the KVM control cable connector will be present. The sealed keyboard with built-in pointing device offers universal output providing USB and PS/2 outputs for the keyboard and 'mouse' devices.

The HE-1400 offers the following features:

Inputs:
- Analog RGB: 60Hz at SXGA, WXGA, XGA, SVGA, VGA With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~SXGA interlaced & noninterlaced.
- DVI-D: 60Hz at SXGA, WXGA, XGA, SVGA, VGA

Image Scaling: Up / down scaling to fit input to native panel resolution of 1280x1024.
Image Control: Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.
Other Features: Auto picture setup, Auto RGB calibration, Auto source seek, OSD timeout, OSD position, Input source select, OSD menu lock, Direct key for brightness level adjustment.

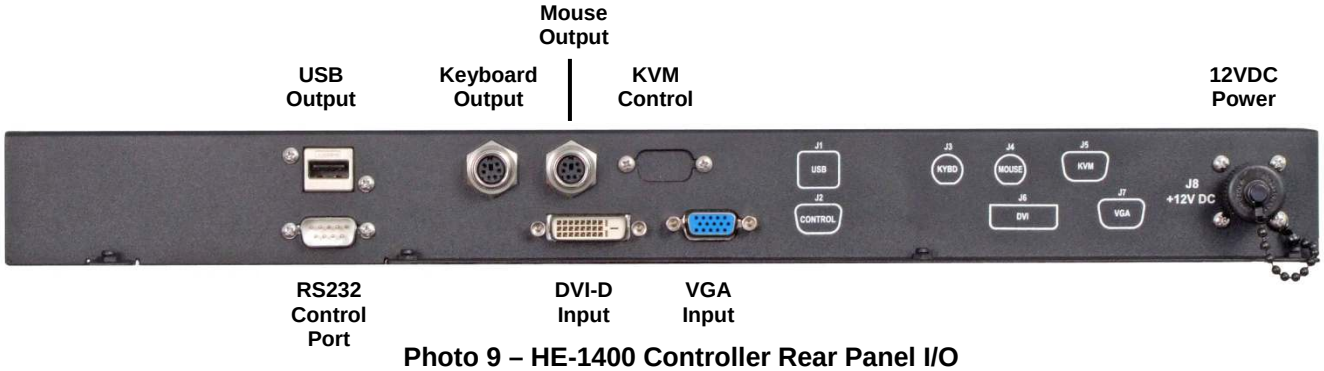


Photo 9 – HE-1400 Controller Rear Panel I/O

Legend	Function	Connector on KVM
USB Output	Keyboard/Mouse USB Output	USB Type 'A'
RS232 Control – Note 1	Remote RS232 Control Port	DB25 Male
Keyboard Output	Keyboard PS/2 Output	PS/2 - Locking
Mouse Output	Mouse PS/2 Output	PS/2 - Locking
KVM Control – Note 2	Control Interface to Optional KVM	DB25
DVI-D Input	DVI-D Video Input	DVI-D Connector
VGA Input	VGA Video Input	HD15 Female
12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P

Table 7 - Rear Panel Connections – HE-1400 Controller

Note:
1. The HE-1400 offers remote serial port control through the RS232 Control Port. See Appendix 1 for details on port pin out assignment and commands.
2. The KVM Control connector is populated only on KVM enabled models.

HE-1600 Controller Rear Panel Connections

The HE-1600 Controller provides for VGA analog, DVI-I, Composite and S-Video video inputs. In addition, the rear of the display provides for Keyboard and Pointing Device outputs plus a Circular Mil connector for power connection. If you have purchased a KVM option, then the KVM control cable connector will be present.

The HE-1600 offers the following features:

Inputs:

Analog RGB: 60Hz @ UXGA
75Hz @ SXGA, WXGA, SVGA, VGA
1152 x 900 @ 66Hz (SUN)
1152 x 900 @ 76Hz (SUN)
1280 x 1024 @ 76Hz (SUN)
With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~USXGA interlaced & non-interlaced.

DVI-I: 60Hz @ UXGA
75Hz @ SXGA, WXGA, XGA,SVGA, VGA

Video: NTSC / PAL / SECAM (Interlaced)
Composite Video
S-Video
Component (YCbCr) (Optional)

Image Scaling: Up / down scaling to fit input to panel resolution.

Image Control: Brightness, Contrast, Saturation, Hue, Frequency, Phase, Color temperature, Image position, Hue, Gamma.

Other Features: Auto Picture Setup, Auto Color Gain, Auto Power, OSD Timeout Position and Transparency, Hot Keys, Auto Source Seek.

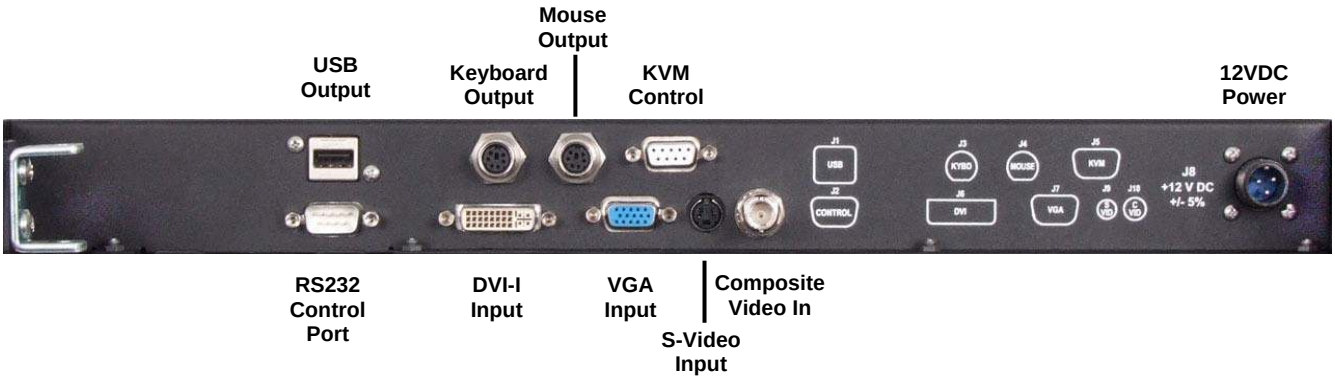


Photo 10 - HE-1600 Rear Panel I/O

Legend	Function	Connector on KVM
USB Output	Keyboard/Mouse USB Output	USB Type 'A'
RS232 Control – Note 1	Remote RS232 Control Port	DB25 Male
Keyboard Output	Keyboard PS/2 Output	PS/2 - Locking
Mouse Output	Mouse PS/2 Output	PS/2 - Locking
KVM Control – Note 2	Control Interface to Optional KVM	DB25
DVI-I Input	DVI-I Video Input	DVI-I Connector
VGA Input	VGA Video Input	HD15 Female
S-Video	S-Video Input	4-Pin Mini Din
Composite Video	Composite Video Input	BNC
12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P

Table 8 - Rear Panel Connections – HE-1600 Controller

Note:

1. The HE-1600 offers remote serial port control through the RS232 Control Port. See Appendix 1 for details on port pin out assignment and commands.
2. The KVM Control connector is populated only on KVM enabled models.

HE-1920 Controller Rear Panel Connections

The HE-1920 Controller provides for VGA analog, DVI-D, Composite and S-Video video inputs. The HE-1920 also supports Picture-In-Picture (PIP) allowing a video input (Composite or S-Video) image to be laid on top of either a VGA or DVI input. In addition, the rear of the display provides for Keyboard and Pointing Device outputs plus a Circular Mil connector for power connection. If you have purchased a KVM option, then the KVM control cable connector will be present.

Note the rear panels for the HE-1600 and HE-1920 are very similar. The primary difference is the HE-1600 offers DVI-I input while the HE-1920 offers DVI-D input. There are also other differences in the function of the controllers.

The HE-1920 offers the following features:

Inputs:

Analog RGB:	60Hz @ UXGA 75Hz @ SXGA, WXGA, SVGA, VGA 1152 x 900 @ 66Hz (SUN) 1152 x 900 @ 76Hz (SUN) 1280 x 1024 @ 76Hz (SUN) With auto detect of Digital Separate Sync, Sync-On-Green & Composite Sync. Auto detects VGA ~UXGA interlaced & non-interlaced.
DVI-I:	60Hz @ WUXGA 60Hz @ UXGA 75Hz @ SXGA, WXGA, XGA, SVGA, VGA
Video:	NTSC / PAL / SECAM (Interlaced) Composite Video S-Video RGB Video SD Component (YCbCr) (Optional)
Image Scaling:	Up scaling to fit input to panel resolution.
Image Control:	Auto configuration, Brightness, Contrast, Clock, Phase, Color temperature, Image position, Saturation, Hue, Gamma.
Other Features:	System Information, OSD position, Scaling to fill screen and fill to aspect ratio, OSD timeout, Factory reset, OSD menu transparency, Horizontal & Vertical image inversion, Picture in Picture.

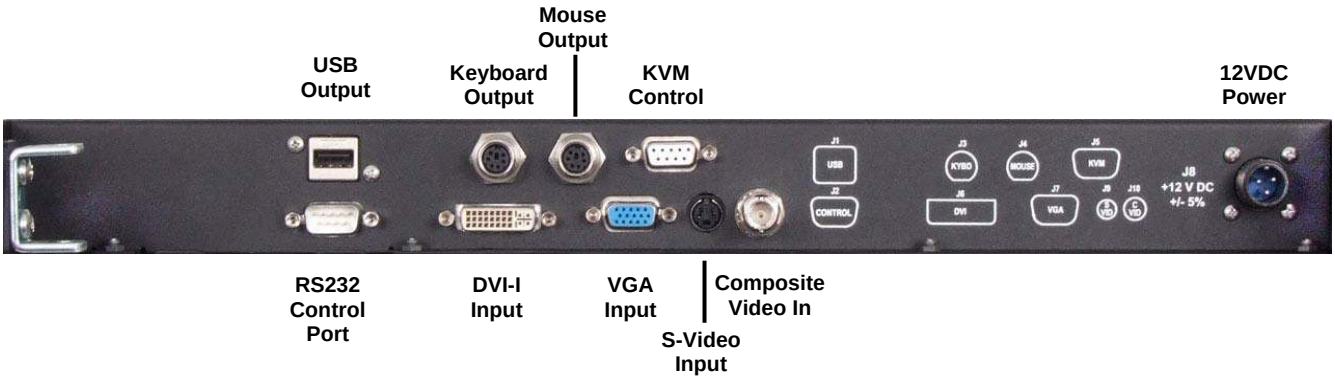


Photo 11 - HE-1920 Rear Panel I/O

Legend	Function	Connector on KVM
USB Output	Keyboard/Mouse USB Output	USB Type 'A'
RS232 Control – Note 1	Remote RS232 Control Port	DB25 Male
Keyboard Output	Keyboard PS/2 Output	PS/2 - Locking
Mouse Output	Mouse PS/2 Output	PS/2 - Locking
KVM Control – Note 2	Control Interface to Optional KVM	DB25
DVI-D Input	DVI-D Video Input	DVI-D Connector
VGA Input	VGA Video Input	HD15 Female
S-Video	S-Video Input	4-Pin Mini Din
Composite Video	Composite Video Input	BNC
12VDC Power	Input Power, 12VDC +/-5%	Circular Mil N/S 3102A-10SL-3P

Table 9 - Rear Panel Connections – HE-1920 Controller

Note:

1. The HE-1920 offers remote serial port control through the RS232 Control Port. See Appendix 1 for details on port pin out assignment and commands.
2. The KVM Control connector is populated only on KVM enabled models.

Chapter 6 - Operation

LCD Front Panel Controls

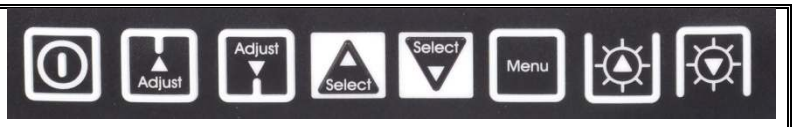
The On Screen Display (OSD) is adjusted as follows:

1. Press the **Menu** Button located on the front of the monitor.
2. Use the buttons described below to maneuver around the Menu.
3. Select the desired OSD Menu from the Menu Screen Shots below to make the desired adjustment(s).
4. Press the **Menu** button to exit out of the OSD Menu when complete or wait for the OSD window to automatically close as set by the OSD Time Out setting.

- **Power:** Turns the Unit On and Off
- **Adjust ▲:**
  - o Hot Key 1 ***Increase***
  - o When the cursor is not showing in sub menus, moves selection ***right*** between top tabs.
  - o Cursor showing in sub menus, adjusts setting ***up***.
  - o Cursor on sub-sub menu (► showing), enters sub-sub menu. (See Select ▲ below to escape).
  - o Toggles ***Off*** to ***On***
- **Adjust ▼**:
  - o Hot Key 1 Decrease
  - o When the cursor is not showing in sub menus, moves selection ***left*** between top tabs.
  - o Cursor showing in sub menus, adjust setting ***down***
  - o Toggles ***On*** to ***Off***
- **Select ▲:**
  - o Hot Key 2 ***Increase***
  - o Moves the cursor ***up***.
  - o When in a sub-sub menu, repeatedly press to move to the previous menu level. (See Adjust ▲ above)
- **Select ▼:**
  - o Hot Key 2 ***Decrease.***
  - o Moves the cursor ***Down***.
- **Menu**
  - o Opens or closes the OSD menu
  - o See Note 1 below for additional information.
- **Brightness ▲:**
  - o ***Increases*** the screen brightness.
- **Brightness ▼:**
  - o ***Decreases*** the screen brightness.

LED: Green-Normal Operation

Green	Normal Operation
Red	Power On but no input signal
Off	No power or display turned off



Hot Keys
Hot Keys are defined in the Utility/Hot Key menu and allow single button access to the defined function.

Adjust ▲ and ▼ - Hot Key 1 Up and Down

Select ▲ and ▼ - Hot Key 2 Up and Down

Display Auto Adjust
Pressing **Auto/Exit** will perform a auto display adjustment when in aRGB mode. This automatically adjusts the Phase and Clock for the best displayed image.

To save your changes, press the front panel **Menu** button. Alternatively, changes are saved if no buttons are pressed and the OSD times out returning back to the display.

Notes On the Menu Buttons –

1. The Menus are context sensitive in that only adjustments pertaining to the selected input will be displayed. For example, if DVI is selected for the input, then items such as Hue will not be adjustable.
2. Pressing the Menu button returns to the previously opened menu.

Notes on Hot Keys -

1. Hot Keys allow single button selection of a function.
2. Definition of the Hot Keys is set in the Utility menu. Thus, for example, if the Adjust keys are set up for Input Source, pushing the Up button rolls Up through the Input Sources and pushing the Down button rolls Down through the Input Sources.
3. The Hot Keys display in the upper left of the screen when pushed.

Note on Factory Default –

1. Under the Utilities Menu, a selection is available to return the board setting to the factory defaults.

Table 10 - Front Panel Controls

HE-1400 Controller OSD Menus

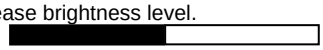
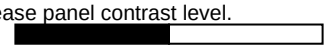
	Select input source		
		Input source 1	Select input source to Analog RGB
		Input source 2	Select input source to DVI
		Auto Source Seek	ON – Auto source select always enable OFF – Disable auto source select function
		Wide screen mode information display*	Select the input mode (1280 / 1360 / 1366 / 1368) to recognize and display the correct input signal information display on the OSD menu. 1280 : 1280x768 1360 : 1360x768 1366 :1366x768 1368 : 1368x768
		Exit	Exit the OSD menu and save the settings
	Brightness and Contrast		
		Brightness	Increase/decrease brightness level. Press – or + (-  +) Total : 256 steps
		Contrast	Increase/decrease panel contrast level. Press – or + (-  +) Total : 192 steps
		Exit	Exit the OSD menu and save the settings
	Color		
		Auto RGB Calibration*	Yes No (Auto Color Calibration [See appendix IV])
		Color Temperature ▸	(Adjust the warmness of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like.)
			Adjust red color level Press – or + (- +) Total :128 steps Adjust green color level Press – or + (- +) Total : 128 steps Adjust blue color level Press – or + (- +) Total : 128 steps Press SEL UP/DN button to select item
			Set the color temperature to 4200K
			Set the color temperature to 5000K
			Set the color temperature to 6500K
			Set the color temperature to 7500K
			Set the color temperature to 9300K
		Gamma adjustment ▸	Adjust Gamma settings (0.4 / 0.6 / 1.0 / 1.6 / 2.2)
			Select Gamma to 0.4
			Select Gamma to 0.6
			Select Gamma to 1.0
			Select Gamma to 1.6
			Select Gamma to 2.2
		Exit	Exit the OSD menu and save the settings

Table 8 - HE-1400 Controller OSD Menus (cont)

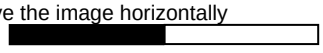
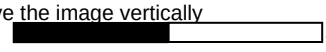
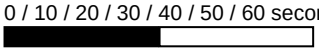
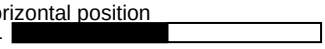
	Position		
		Autosetup*	Auto adjust the positions, phase, frequency Yes No
		Frequency*	Adjust the image horizontal size
		Phase*	Fine tune the data sampling position (adjust image quality)
		Image Horizontal Position*	Use +/- to move the image horizontally Press – or + (-  +)
		Image Vertical Position*	Use +/- to move the image vertically Press – or + (-  +)
		Exit	Exit the OSD menu
	Utilities		
		OSD setting ▸	
			OSD Timeout : 0 / 10 / 20 / 30 / 40 / 50 / 60 seconds (Always on when set to 0) Press – or + (-  +)
			OSD menu horizontal position Press – or + (-  +)
			OSD menu vertical position Press – or + (- +)
		Load Factory Default	Initialize the setting stored in non-volatile memory
		Sharpness	Adjust sharpness level Press – or + (- +) Total : 7 steps
		Exit	Exit the OSD menu
	Exit the OSD menu		

Table 11 - HE-1400 Controller OSD Menus

HE-1600 Controller OSD Menus

Picture :

Volume Increase/decrease volume level, total 31 steps

Brightness Increase/decrease panel brightness level, total: 100 steps

Contrast Increase/decrease panel contrast level, total: 100 steps

Hue * Increase/decrease Hue level, total: 100 steps

Saturation * Increase/decrease saturation, total: 100 steps

Sharpness Increase/decrease sharpness, total: 15 steps

Aspect Size ▸

Aspect Ratio : Fill Screen / Fill Aspect / 1 to 1 (UNDER ARGB / DVI mode)
Auto / Fill Screen / 1 to 1 / Anamorphic (UNDER VIDEO MODE)
- Fill Screen : Enable full screen expansion for lower resolution Image
- Fill Aspect : Enable fill screen expansion for lower resolution image according to aspect ratio
- 1 to 1 : Display the exact image resolution on the screen without image expansion.

Horz Position Move the image position horizontally

Vert Position Move the image position vertically

Blue Only : OFF / ON : Turn off the "Red" & "Green" channel (i.e output all zero to Red & Green channel)

* : DISPLAY IN VIDEO MODE ONLY

Main Source : Select the input video signal

VGA 1 / Composite Video / S-Video / VGA 2 / DVI / HD/SD Component

Utilities :

Setup ▸

Auto Picture Setup# ▸ : Auto adjust the image position, phase and size

Auto Color Gain# ▸ : Auto Color Calibration (Function in ARGB mode ONLY – See appendix IV)

Manual Clock# : Adjust the image horizontal size

Manual Phase# : Fine tune the data sampling position (adjust image quality)

Auto Source Seek : OFF / ON
ON – Auto source select always enable
OFF – Disable auto source select function

Auto Power : OFF / ON
ON – Enable soft power off function if absence of input signals
OFF – Disable soft power function

Video Standard (SD)** : Auto / NTSC / PAL / SECAM / NTSC 443

Gamma : 1.0 / 1.6 / 2.2

OSD ▸

H Position : Move the OSD menu image horizontally

V Position : Move the OSD menu image vertically

Timeout (sec) : 1 – 20 : Adjust the OSD menu timeout period in a step of 1 seconds (max 20 seconds)

Language : English / Simplified Chinese : Select OSD menu language display

Transparency : 0 – 100 steps

Table 9 - HE-1600 Controller OSD Menus (cont)

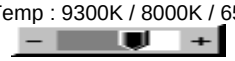
(continued)	**Color Temperature** ‣ Color Temp : 9300K / 8000K / 6500K / 5000K Red :  Green : Blue : **Hot Key** ‣ Hot key 1 : Brightness / Contrast / Input / Aspect / Volume Hot key 2 : Brightness / Contrast / Input / Aspect / Volume **Reset to Factory Defaults** ‣ Factory Defaults Reset Color Gain# DDC Updates ** : FUNCTION IN VIDEO MODE ONLY # : DISPLAY AND FUNCTION IN VGA MODE ONLY

Table 12 - HE-1600 Controller OSD Menus

HE-1920 Controller OSD Menus

Picture :

Volume[###] Increase/decrease volume level, total: 100 steps

Brightness Increase/decrease panel brightness level, total: 100 steps

Contrast Increase/decrease panel contrast level, total: 100 steps

Saturation Increase/decrease saturation, total: 100 steps

Hue ** Increase/decrease Hue level, total: 100 steps

Sharpness* Increase/decrease sharpness, total: 30 steps

Position[##]

Move the image position upward

Move the image position downward

Move the image position to the left

Move the image position to the right

Backlight Backlight brightness adjustment (Function when light detector sets OFF)

Aspect / Size ▸

- Fill Screen : Enable full screen expansion for lower resolution Image
- Fill to Aspect Ratio: Enable fill screen expansion for lower resolution image according to aspect ratio
- 4 : 3 : scaling format in 4:3
- 16 : 9 : scaling format in 16:9
- 16 : 10 : scaling format in 16:10
- 2.35 : 1 : scaling format in 2.35:1
- 2 : 1 : scaling format in 2:1
- 1 : 1 : Display the exact image resolution on the screen without image expansion.
- Custom Sizing[####] :

Overscan
Normal
Custom ▸

H Size
V Size
H Pan
V Pan

Blue Only ON / OFF : Turn off the "Red" & "Green" channel (i.e output all zero to Red & Green channel)

[This function will display on OSD menu when JP4 – 5-6 closed]

* : DISPLAY IN VIDEO MODE ONLY
** : FUNCTION IN ARGB/ DVI / VIDEO NTSC MODE ONLY
# : DISPLAY IN ARGB / DVI MODE ONLY
: FUNCTION IN ARGB MODE ONLY
: DISPLAY WHEN VIDEO ADD-ON BOARD CONNECTED
: DISPLAY IN VIDEO / HD/SD SDI 1 / HD/SD SDI 2 MODE ONLY

Input : Select the input video signal

HD/SD SDI 1
HD/SD SDI 2***
VGA#
DVI
Composite 1
Composite 2***
S-Video
SD Component

: Press "-" key to activate the "Auto Picture Setup" function.

PIP Setup ▸
PIP Source ▸
HD/SD SDI 1 / HD/SD SDI 2 / VGA / DVI / / Composite 1 / Composite 2 / S-Video / SD Component / Off

PIP Size : Off / Small / Medium / Large / PBP
4 possible input groups that can be mixed for PIP :
a) VGA
b) DVI
c) HD-SDI
d) Composite/S-Video/SD-component
It can not allow to select signal source from the same group for PIP.

PIP Position :

Move the PIP position upward

Move the PIP position downward

Move the PIP position to the left

Move the PIP position to the right

PIP Swap : Swap between the main window and PIP window

PIP Auto off :

: OFF / ON
ON : When PIP is no signal input after 30 seconds, the PIP window will turn off automatically.
OFF : PIP window keeps on

*** DISPLAY WHEN SETTING ON UNDER SETUP → AUTO SOURCE SEEK

Utilities :

Setup ▸

Auto Picture Setup[#] : Auto adjust the image position, phase and size

Auto Color Gain[##] : Auto Color Calibration (See appendix IV)

Wide Screen Mode detection[#] ▸ : Recognize the wide screen mode coming from ARGB port

- Off
- 1280x768
- 1366x768

Manual Clock[##] : Adjust the image horizontal size

Manual Phase[#] : Fine tune the data sampling position (adjust image quality)

Auto Source Seek :

- Auto : : OFF / ON
  ON – Auto source select always enable
  OFF – Disable auto source select function
- Setup ▸ Selection for the corresponding input sources detection

HD/SD SDI 1

HD/SD SDI 2

VGA

DVI

Composite 1

Composite 2

S-Video

SD Component

The corresponding input port name display on OSD menu will disappear once setting “OFF”.

De-interlacing Mode* ▸

AFM : Auto Film Mode

TNR : Temporal Noise Reduction

MADI : Motion Adaptive De-interlacing

LADI : Low Angled De-interlacing

Auto Power : OFF / ON
ON – Enable soft power off function if absence of input signals
OFF – Disable soft power function

Video Standard (SD)* : Auto / NTSC / NTSC 4.43 / PAL / PAL M / SECAM

Image Orientation : Normal / Horizontal flip / Vertical flip / Rotate

Gamma : 1.0 / 1.6 / 2.2

OSD ▸

OSD position :

H POS : Move the OSD menu image horizontally

V POS : Move the OSD menu image vertically

OSD Timeout (sec) : ON – 60 : Adjust the OSD menu timeout period in a step of 5 seconds (max 60 seconds)
ON = Continuous to display OSD menu.
60 = 60 seconds later will turn off the OSD menu.

Language : English / Chinese : Select OSD menu language display

Transparency : ON / OFF : Set OSD transparency

Freeze : Freeze the image (use “+” button)

Zoom ▸

Zoom level : : Enable the zoom in function on the image displayed.
Use “+” button to zoom in the image
Use “-“ button to decrease the zoomed image

Horizontal pan : : Pan the image horizontally

Vertical pan : : Pan the image vertically

Reset to Defaults : Restore to default values

Note : Freeze state will be cleared when you using zoom function.

Color Temperature ▸

5000K

R Gain :

G Gain :

B Gain :

Reset to Defaults : Resume to the default values

6500K

R Gain :

G Gain :

B Gain :

Reset to Defaults : Resume to the default values

8000K

R Gain :

G Gain :

B Gain :

Reset to Defaults : Resume to the default values

9300K

R Gain :

G Gain :

B Gain :

Reset to Defaults : Resume to the default values

User setting :

R Gain :

G Gain :

B Gain :

Reset to Defaults : Resume to the default values

Reset All to Defaults : Resume all color temperature settings to the default values.

Hot Key ▸

Hot key 1 : Volume / Brightness / Contrast / Input / Aspect / Zoom / Freeze / PIP Size / PIP Swap / Image Orientation / Saturation / Hue / Backlight / Auto Picture Setup

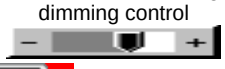
Hot key 2 : Volume / Brightness / Contrast / Input / Aspect / Zoom / Freeze / PIP Size / PIP Swap / Image Orientation / Saturation / Hue / Backlight / Auto Picture Setup

Monochrome Mode ▸

- Color
- Red Monochrome
- Green Monochrome
- Blue Monochrome

Backlight Setup ▸

- B/L Invert :

: Invert for the backlight brightness
- B/L Control : D/A / PWM : Selection for voltage level dimming control / PWM dimming control
- Backlight Frequency :  100 ~ 440Hz in a step of 20
- Light Detector :

: Enable ambient light detector function by using KIT 70220-3

Reset to Factory Defaults

* : DISPLAY IN VIDEO MODE ONLY
\# : DISPLAY IN ARGB MODE ONLY
: DISPLAY IN ARGB_MODE ONLY

Chapter 7 – KVM Programming

KVM Keyboard Access

As optionally installed, the KVM active port can be selected by using the front panel push buttons with the active port displayed by LEDs under the switches.

Alternatively, keyboard sequences can be used to switch ports or program functions on the KVMs. Each KVM has its own "programming" language as shown below. The active port will also display a lit LED under the front panel switches.

KVMX-4DVI KVM Keyboard Commands

Keyboard hotkeys

A keyboard hotkey sequence consists of at least three specific keystrokes: *See KVM-4DVI Quick Guide below.*

Hotkey sequence = [ScrLk]* + [ScrLk]* + *Command key(s)*
*** User-definable = SCROLL LOCK**, **CAPS**, **ESC**, **F12** or **NUM LOCK**

Hotkey preceding sequence configuration:
For users who want to use a preceding sequence other than two consecutive Scroll Locks, there is also one convenient way to configure it.

(1) Hit ScrollLock + ScrollLock + H, then two beeps will signal readiness for new preceding sequence selection [or Press and hold down the last front-panel button (Button 4, 8 or 16) until you hear two beeps, release the button.]

(2) Select and press the key you would like to use as your preceding sequence (**SCROLL LOCK**, **CAPS**, **ESC**, **F12 or NUM LOCK** keys are available for selection) and you'll hear a beep for selection confirmation. Now you can use the new preceding sequence to execute your hotkey commands.

Note: The two consecutive ScrLk (scroll lock) keystrokes should be pressed within 2 seconds and the following command key(s) should also be pressed within 2 seconds in likewise manner. Otherwise, the hotkey sequence will not be validated.

19" Rackmount USB PS/2 KVM Switch / Operation Commands for Hotkeys/ Front-Panel Button ***Hotkey sequence = [ScrLk]* + [ScrLk]* + Command key(s) * User-definable Preceding sequence = SCROLL LOCK, CAPS, ESC, F12 or NUM LOCK***			
Command	**Hotkeys**	**Front-panel Button**	**Description**
Select PC Channel	**For KVMX-4DVI** ScrLk + ScrLk + (x)[1] x = 1 ~ 4/1~8 for PC channel number	*Press the corresponding* front-panel *button to select the desired PC channel*	Select the active PC channel
Next lower PC channel	ScrLk + ScrLk + ↑ (arrow up)	--	Select the next lower PC channel (Switch only to the next lower channel with live power input from PS/2 or USB interface)
Next higher PC channel	ScrLk + ScrLk + ↓ (arrow down)	--	Select the next higher PC channel (Switch only to the next higher channel with live power input from PS/2 or USB interface)
Previous PC channel	ScrLk + ScrLk + ← (Backspace)	--	Toggle between the previous channel and current channel
Beep Sound On/Off [default = ON]	ScrLk + ScrLk + **B**	--	Toggle on/off the beep sound for hotkey/channel switching operation
Mouse/Keyboard Reset[2]	**ScrLk + ScrLk + End**	--	Reset mouse/keyboard
Autoscan	ScrLk + ScrLk + **S**	--	Autoscan through every connected channel for quick screen browsing of each channel (scan delay = 5 sec.)
Define Hotkey Preceding Sequence [default = ScrLk + ScrLk]	ScrLk + ScrLk + **H** + **(y)** *(y) = SCROLL LOCK, CAPS, ESC, F12 or NUM LOCK*	Press and hold down last button (Button 4 / Butotn8 / Button 16) till two beeps, release the button, then press **(y)** key.	Select the hotkey preceding sequence among 5 alternative keys
Restore to Factory Default [3]	**ScrLk + ScrLk + R**	--	Restore to factory setting (factory default = beep sound ON / hotkey preceding sequence set to ScrLk + ScrLk)
Firmware Upgrade	--	*Button 1* *(Press and hold down for 2" till 2 beeps, indicating its ready for firmware upgrade file upload)*	Go into Upgrade Mode and ready for firmware upgrade file upload. For more details, please refer to the *Firmware Upgrade Operation Guide*.
Autoscan with Programmable Delay Time [default = 10 seconds]	ScrLk + ScrLk + **S** + **(x)**[1] x = 0~9 1 → 10" ; 2 → 20" ; 3 → 30" ; 4 → 40" ; 5 → 50" 6 → 60" ; 7 → 70" ; 8 → 80" ; 9 → 90" ; 0 → 100"	--	Autoscan with a user-defined delay time within a range of 10 ~ 100 seconds. [Default = 10 seconds]
Stop Autoscan	*Press any key on keyboard*	*Press any button*	Terminate Autoscan activity

Table 13 - KVM-4DVI Quick Guide

Notes:

1. *You can use either top row number keys or the keypad number keys for hotkeys commands.*
2. *In normal usage condition, mouse/keyboard should not require any use of this hotkey. However, if you encounter keyboard/mouse lockup or other problems, you can use this keyboard/mouse reset hotkey to facilitate recapturing of the keyboard/mouse device on the connected PC.*
3. ***If your hotkey preceding sequence has been changed by a previous user**, and you don't' know what it is exactly, please just try over the possible alternatives: either they are* **SCROLL LOCK**, **CAPS**, **ESC**, **F12** or **NUM LOCK**. *You should be able to find what the currently preceding sequence is within a minute.*

Mac user: *Standard* PC *Keyboard* == mapping to == MAC *Keyboard* → ScrLk + ScrLk + C = ⏏ *(CD/DVD drive eject key);* ScrLk + ScrLk + F10 = **F13** ; ScrLk + ScrLk + F11 = **F14** ; ScrLk + ScrLk + F12 = **F15**

LED information: *a solid red-lit LED indicates a live power input for that specific port;*

Hotkey convention: *The hotkey notation* ScrLk + ScrLk + (key)*, denotes that you should hit the individual key consecutively one at a time, not simultaneously.*

KVMX-4VGA and -8VGA KVM Keyboard Commands

The KVMX-4VGA and KVMX-8VGA offer programming via an on-screen display (OSD) or via Hot Key combinations. The ports can also be selected via the front panel switches with LEDs under the switches indicating the active port. Programming for each model is the same with the exception of the number of available ports.

There are three ways to select a specific computer (on a specific switch, if you have multiple daisy-chained KVM switches), using *front-panel push button*, *hotkey sequence* or *OSD Menu.*

Front-panel push buttons

The front-panel buttons let you have direct control over KVM switch operation and channel switching. Simply press a button to switch to its corresponding channel. *See Quick Guide below.* The LED under the push button will light for the selected port.

Keyboard Hotkeys

A keyboard hotkey sequence consists of at least three specific keystrokes: *See Quick Reference Sheet*

Hotkey sequence = [ScrLk]* + [ScrLk] * + Command key(s)
*** User-definable = SCROLL LOCK**, **CAPS**, **F12** or **NUM LOCK**

Note: The two consecutive ScrLk keystrokes should be pressed within 2 seconds and the command key(s) that follow should also be pressed within 2 seconds in likewise manner. Otherwise, the hotkey sequence will not be validated.

To activate the OSD (*On Screen Display*) Menu, use the hotkey sequence:

Activate OSD = ***ScrLk + ScrLk + Space Bar***
Deactivate OSD = ***ESC (Escape key)***

Figure 7 – KVMX-_VGA OSD Main Menu

Figure 8 - KVMX-_VGA OSD Status Menu

Main menu

Select computer: use **Up/Down** Arrow key to navigate, **PgUp/PgDn** to scroll page. Hit **Enter** to select.
Edit computer name: just hit **Insert** to edit and **Enter** to confirm.

F1 : Next Page - rotate through Main Page / Setup page / Status page

F10: Logout - lock your keyboard and mouse for security. Password will be needed to log in.

Setup Menu

Autologout: specify time for auto logout (00~99 min)

OSD timeout: specify duration for OSD menu to stay on screen

Autoscan period: specify time for autoscan period

Title bar: enable/disable the title bar, and also specify its position

Hotkey: specify the hotkey preceding sequence (**SCROLL LOCK**, **CAPS**, **F12** or **NUM LOCK)**

Password: specify the password for access

Load Default: Load default setting to all KVM switches in the daisy-chain.

OSD Appearance: Specify whether you want to keep or hide the OSD menu after port switching operation.

Status Menu

On this page, the connection information of each port will be shown.

Note: The KVMX-4VGA and KVMX-8VGA support bank switching (daisy chaining). However, the front panel port active LEDs will reflect the active port on a bank but not the bank number.

QUICK REFERNCE SHEET for Cascadable Rackmount USB PS/2 KVM Switch -- Operation Commands *Hotkeys/ OSD Menu / Front-Panel Buttons* *Hotkey sequence = [ScrLk]* + [ScrLk]* + Command key(s) * User-definable Preceding sequence = SCROLL LOCK, CAPS, F12 or NUM LOCK*				
Command	**Hotkeys**	**OSD control[1]**	**Front-panel**	**Description**
Select Computer	ScrLk + ScrLk + *(a)* + *(b)* + *(y)* + *(z)* (*ab = bank no. ; xy = channel no.*)[2]	*Cursor keys to navigate* *Enter to select*	*Press corresponding button yz on Switch ab for channel yz on bank ab.*	Select the active bank (switch) and channel
Next lower channel	ScrLk + ScrLk + ↑ **(arrow up)**	*Cursor keys to navigate* *Enter to select*	*Press corresponding button*	Select the next lower connected channel within the current active bank
Next higher channel	ScrLk + ScrLk + ↓ **(arrow down)**	*Cursor keys to navigate* *Enter to select*	*Press corresponding button*	Select the next higher connected channel
Next lower bank	ScrLk + ScrLk + PgUp	*PgUp (w/ OSD Menu)*	*Press corresponding button on that switch*	Select the next lower bank (switch) when with multiple daisy-chained units
Next higher bank	ScrLk + ScrLk + PgDn	*PgDn (w/ OSD Menu)*	*Press corresponding button on that switch*	Select the next higher bank (switch) when with multiple daisy-chained units
Autoscan Beep Sound On/Off	ScrLk + ScrLk + B	--	--	Toggle on/ off the beep sound for switching confirmation while autoscanning
Define Hotkey Preceding Sequence	ScrLk + ScrLk + H + **(y)** *y = SCROLL LOCK, CAPS, F12 or NUM LOCK*	*Main Menu/Setup/Hotkey* *[SCROLL LOCK, CAPS, F12 or NUM LOCK]*	--	Select the hotkey preceding sequence among 5 alternative keys
Load Default	--	*Main Menu / Setup / Load Default*	--	Restore all settings (Autologout, OSD timeout, etc.) on all KVM switch to the factory default ** This will not affect password*
OSD Appearance	--	*Main Menu / Setup /OSD Appearance*	--	Specify whether you want to keep or hide the OSD menu after port switching operation.
Change Computer Name	--	*Cursor keys to navigate* *Enter (Ins) to select/ edit*	--	Change the computer name [max. length = 8 alphanumeric characters]
Reset Console Mouse	ScrLk + ScrLk + End	--	--	Reset console mouse when mouse is locked up
Show OSD Menu	ScrLk + ScrLk + (Space Bar)	--	--	Activate the OSD Menu on the console screen
Autoscan	ScrLk + ScrLk + S	--	--	Autoscan through every connected channel for quick screen browsing of each channel.
Stop Autoscan	*Any key*	--	*Press any push button*	Terminate Autoscan activity
Autoscan Period [5 ~ **10** ~ 95 seconds]	--	*Main Menu / Setup / Autoscan period*	--	Specify delay time within a range of 5 ~ 99 seconds [default = 10 sec]
Auto Logout Timeout Enable/Disable [**0** ~ 99 min]	--	*Main Menu / Setup / Auto Logout*	--	Specify the time out for auto logout – screen /keyboard/ mouse locked after timeout period for security. (default = 0 = disable)
OSD Menu Timeout [0 ~ **60** ~ 95 seconds]	--	*Main Menu / Setup / OSD Timeout*	--	Specify the timeout for OSD menu [default = 60 seconds; 0 = disable]
OSD Title Bar On/Off [**ON**/OFF]	ScrLk + ScrLk + T	--	--	Enable/ disable the OSD Title Bar [default = ON]
OSD Title Bar Position [**Left**/Right]	--	*Main Menu / Setup / Title Bar*		Select the OSD title bar position on your screen
Setup Password [3] [**Disable**/Enable]	--	*Main Menu / Setup / Setup Password*	--	Enable/ disable password protection [default == disable; password length <= 8 characters]

Table 14 - KVM-4VGA / KVM-8VGA Quick Guide

Notes:

1. OSD Menu control is only available when the OSD menu is activated on the screen. To activate the OSD menu, use the hotkey sequence ScrLk + ScrLk + *(Space Bar)*. For detailed OSD operation reference, please refer to the *User Guide. When OSD Menu is active, the mouse will be locked until the OSD Menu is off. For detailed OSD function, please refer to previous OSD Menu section.*

2. Note that *a*, *b*, *y* and *z* each denotes a number key. (ab) = 01 ~ 16 ; (yz) = 01 ~ 08. For example, ScrLk + ScrLk + 03 + 06 is for bank 3 port 6. When using a single KVM Switch configuration, the default bank no. is 01, therefore hit ScrLk + ScrLk + 01 + 12 for port 12 for a single KVM Switch configuration.

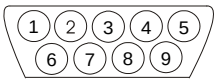
3. The password is up to 8-character length. You should remember the password since it is required for access to your KVM switch once you enable the password protection for your KVM switch. However, if you forget the password and thus are blocked from KVM access, you should contact your local dealer for tech support.

Appendix A – Display Serial Control Programming

The LCD controllers provide for remote serial RS232 control through the rear panel Control Port as shown below.

RS-232 Serial control

Baud rate **2400, 8 bits, 1 stop bit and no parity**



Mating face of
RS-232 DB9 Male

PIN#	Description
2	RS-232 Rx Data
3	RS-232 Tx Data
5	Ground

Mating connector : DB9 Female

HE-1400 Controller Serial Control Functions

The OSD functions are controlled through the following RS-232 commands.

The RS-232 program can be custom-tailored to fit the application or it can be used as provided by Chassis Plans on request. Please contact Chassis Plans for additional information.

Table 15 - HE-1400 Commands to Implement Switch Mount Control Buttons

Function	Command	Description	Acknowledge (if enabled)
OSD Menu Lock	0xf6	OSD menu Lock Off / OSD menu Lock On	Button equivalent
Menu	0xf7	Menu button pressed	Button equivalent
Select-down button	0xfa	Select down button pressed	Button equivalent
Select-up button	0xfb	Select up button pressed	Button equivalent
Right/+ button	0xfc	Right/+button pressed	Button equivalent
Left/- button	0xfd	Left/- button pressed	Button equivalent

Table 16 - HE-1400 Parameter Setting - Immediate, Relative, Reset and Query

Function	Command	Description	Acknowledge (if enabled)
Brightness control	0x81, nn | “+” | “-” | “r” | “R” | “?”	Set brightness = value/increment/decrement Reset Query	Brightness. Range: “0””0”-“F””F” Default: “8””0”
Contrast control	0x82, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set all contrast = value/increment/decrement Reset Query	Contrast. Range: “4””0”-“F””F” Default: “8””0”
Phase #	0x85, nn | “+” | “-” | “?”	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In ARGB mode only)
Image H position #	0x86, nnnn | “+” | “-” | “?”	Set img_hpos = value/increment/decrement Query	Image horizontal position. (In ARGB mode only)
Image V position #	0x87, nnnn | “+” | “-” | “?”	Set img_vpos = value/increment/decrement Query	Image vertical position. (In ARGB mode only)
Frequency #	0x8b, nnnn | “+” | “-“ | “?”	Set H active size = value/increment/decrement Query	Frequency adjustment (In ARGB mode only)
Input main select * Function in valid mode only	0x98, nn | “+” | “-“ | “r” | “R” | “?”	Select input main = PC or video or next available Reset Query	Main selected. “0x41,0x31” ARGB (Default) “0x46,0x31” DVI
Colour temperature select	0xb3, n | “r” | “R” | “?”	Select colour temperature = value Reset Query	Main selected. “0” – user defined RGB values. “1” – 4200K. “2” – 5000K. “3” – 6500K. “4” – 7500K. (Default) “5” – 9300K.
Red level for selected colour temperature	0xb4, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature. Range: “8””0”-“F””F” Default: “F””F”

Green level for selected colour temperature	0xb5, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature. Range: "8""0"-"F""F" Default: "F""F"
Blue level for selected colour temperature	0xb6, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature. Range: "8""0"-"F""F" Default: "F""F"
OSD turn off	0xbd	Turn off the OSD	"1" - successful
Backlight brightness control	0xe0, nn | "+" | "-" | "r" | "R" | "?"	Set backlight brightness = value/increment/decrement Reset Query	Backlight brightness. Range: "0""0"-"F""F" Default: "F""F" e.g "1""0" → 0xe0 0x31 0x30 * This control can only function when JP2 sets 3-4 closed * Apply for inverter control voltage in range of 0~5V. Each step interval is in 1
Backlight on/off control	0xe1, "0" | "1" | "r" | "R" | "?"	Set backlight brightness = Disable backlight Enable backlight Reset Query Backlight working status	Backlight on/off. "1" = normal (Default)
OSD menu Lock (Functon available in V1.80.00 or later revision)	0xf6, n | "0" | "1" | "r" | "R" | "?"	OSD menu Lock Off/ On Reset Query	"0" – OSD Lock Off "1" – OSD Lock On

- Function in ARGB mode only

Table 17 - HE-1400 Other Control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, “0” | “1”	Disable/enable command acknowledge.	“0” – acknowledge disabled. “1” – acknowledge enabled.
Auto-setup#	0xc3	Start auto-setup of current mode.	“0” – fail. “1” – successful.
Command availability	0xc4, n	Check whether a command is available.	“0” – not available. “1” – available.
Auto-calibration#	0xc5	Start auto-calibration of gain of the RGB amplifier.	“0” – fail. “1” – successful.
Query BIOS version	0xcb, “0”	Read BIOS version	“nnnn” = BIOS ver. “nn.nn”
Query PCBA number	0xcb, “1”	Read PCBA number	“nnnn” = PCBA number ALR-1400=”41710”
Load factory defaults	0xce	Reset all parameters to factory default value	“1” – successful.

HE-1600 Controller Serial Control Functions

The OSD functions are controlled through the following RS-232 commands.

The RS-232 program can be custom-tailored to fit the application or it can be used as provided by Chassis Plans on request. Please contact Chassis Plans for additional information.

Table 18 - HE-1600 Commands to Implement Switch Mount Control Buttons

Function	Command	Description	Remark
Menu button	0xf7	Menu button pressed	Button equivalent
Select-down button	0xfa	Select-down button pressed	Button equivalent
Select-up button	0xfb	Select-up button pressed	Button equivalent
Right/+ button	0xfc	Right/+ button pressed	Button equivalent
Left/- button	0xfd	Left/- button pressed	Button equivalent

Table 19 - HE-1600 Parameter Setting - Immediate, Relative, Reset and Query

Function	Command	Description	Acknowledge (if enabled)
Volume control - left+right channel	0x80, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set audio (L+R) volume = value/increment/decrement Reset Query	volume Range : “0” “0” ~ “1” ”F” Default : “0” “A”
Volume control - on/off (mute)	0x80, “m” | “M”, “0” | “1” | “r” | “R” | “?”	 Disable audio output. Enable audio output. Reset Query	“0” - audio off (muted). “1” - audio on (Default)
Brightness control	0x81, nn | “+” | “-” | “r” | “R” | “?”	Set brightness = value/increment/decrement Reset Query	Brightness. Range : “0” “0” ~ “6” “4” Default : “3” “2”
Contrast control	0x82, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set all contrast = value/increment/decrement Reset Query	Contrast Range : “0” “0” ~ “6” “4” Default : “3” “2”
Saturation control	0x83, nn | “+” | “-” | “r” | “R” | “?”	Set saturation = value/increment/decrement Reset Query	PAL/NTSC saturation (In video mode only) Range : “0” “0” ~ “6” “4” Default : “3” “2”

Hue control	0x84, nn | “+” | “-” | “r” | “R” | “?”	Set hue = value/increment/decrement Reset Query	NTSC hue (In NTSC mode only) Range : “0” “0” ~ “6” “4” Default : “3” “2”
Manual Phase	0x85, nn | “+” | “-” | “?”	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In PC mode only)
Image H position	0x86, nnnn | “+” | “-” | “r” | “R” | “?”	Set img_hpos = value/increment/decrement Reset Query	Image horizontal position. (In PC mode only)
Image V position	0x87, nnnn | “+” | “-” | “r” | “R” | “?”	Set img_vpos = value/increment/decrement Reset Query	Image vertical position. (In PC mode only)
Sharpness	0x8a, nn | “+” | “-” | “r” | “R” | “?”	Set sharpness = value/increment/decrement Reset Query	Sharpness. Range : “0” “0” ~ “0” “F” Default : “0” “0”
Manual Clock	0x8b, nnnn | “+” | “-“ | “?”	Set H active size = Value/increment/decrement Query	Graphic mode H active size (in pixels)
Scaling Mode	0x8c, “0” | “1” | “2” | “3” “r” | “R” | “?”	Set graphic image scaling mode = value Reset Query	Image expansion on/off. “0” – 1:1 “1” – fill screen (Default) “2” – fill aspect
OSD H position	0x90, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_hpos = value/increment/decrement Reset Query	OSD horizontal position.
OSD V position	0x91, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_vpos = value/increment/decrement Reset Query	OSD vertical position.
OSD Transparency	0x92, n | “+” | “-” | “r” | “R” | “?”	Set OSD transparency = value/increment/decrement Reset Query	OSD tranparency. Range : “0” “0” ~ “6” “4” Default : “3” “2”

Select menu timeout	0x93, nn | "+" | "-" | "r" | "R" | "?"	Select menu timeout = value/increment/decrement Reset Query	OSD menu timeout value. Range : "0" "0" ~ "1" "4" Default : "0" "A" "0" "0" – 0 second value – Round up to nearest available step. if value > max available step, set it to the max available step.
Select OSD language	0x95, n | "r" | "R" | "?"	Select language = English, Italian,… Reset Query	"0" – English. (Default) "8" – Chinese
Input main select	0x98, nn | "+" | "-" | "r" | "R" | "?"	Select input main = PC or VIDEO or next available Reset Query	Main selected. 0x41 0x31 : VGA 1 0x41 0x32 : VGA 2 0x42 0x31 : Composite 0x43 0x31 : S-video 0x44 0x31 : HD/SD Component 0x46 0x31 : DVI 0x47 0x31 : HD/SD Component (Source sequence : VGA 1 → Composite → S-Video → VGA 2 → DVI → HD/SD Component)
Video System	0x9b, "0" | "1" | "2" | "3" | "r" | "R" | "?"	Set video system = Auto/NTSC/PAL/SECAM Reset Query	"0" – Auto (Default) "1" – NTSC "2" – PAL "3" – SECAM "4" – NTSC_443 (In video mode only)
GAMMA value select	0x9d, n | "r" | "R" "?"	Select GAMMA value = Value Reset Query	GAMMA value: "0" – 1.0 (Default), "1" – 1.6 "2" – 2.2, "3" – User Defined
Auto power off	0x9f, "0" | "1" | "r" | "R" | "?"	Set power down option = On/Off Reset Query	"0" – Off. "1" – On (Default)
Direct Access (Hotkeys)	0xa0, "1", n | "r" | "R" | "?"	Set Hotkey 1= Value Reset Query	"1" – volume. "2" – brightness (Default) "3" – contrast. "5" – input source "C" – Aspect

Direct Access (Hotkeys)	0xa0, "2", n | "r" | "R" | "?"	Set Hotkey 2 = value Reset Query	"1" – volume. "2" – brightness. "3" – contrast (Default) "5" – input source "C" - Aspect
Set runtime counter	0xa1, nnnnn | "r" | "R" | "?"	Set runtime counter value = nnnnn (* 0.5 hour) Reset Query	Runtime = nnnnn.
Colour temperature select	0xb3, n | "r" | "R" | "?"	Select colour temperature = value Reset Query	Main selected. "0" – 9300K. "1" – 8000K. (Default) "2" – 6500K. "3" – 5000K.
Red level for selected colour temperature	0xb4, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature.
Green level for selected colour temperature	0xb5, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature.
Blue level for selected colour temperature	0xb6, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature.
Graphic horizontal resolution enquiry	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	"nnn" = horizontal resolution
Graphic vertical resolution enquiry	0xb8	Vertical resolution (in lines) in 3 digit hex number	"nnn" = vertical resolution
Graphic horizontal sync frequency	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	"nnn" = horizontal frequency

Graphic vertical sync frequency	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number	“nnn” = vertical frequency
OSD turn off	0xbd	Turn off the OSD.	“1” – successful.
Set gamma data for user defined gamma curve	0xbf, mm, c, “?” 0xbf, “R” | “r” 0xbf, mm, c, nn	Query gamma data for color c index mm (c = 0 for color Red, c=1 for color Green, c=2 for color Blue) Set user gamma curve to linear Set gamma data for color c index mm. (If c= 3, then gamma data for red, green & blue will be set at the same time.)	“nn” = gamma data “1” “nn” = gamma data
Query firmware version	0xcb, “0”	Read BIOS version	BIOS version “VV.YY.ZZ” VV = V0 or E0, V0 = Release version E0 = Engineering Sample YY= Version Number ZZ= Customer Number
Backlight Brightness control	0xe0, nn | “+” | “-” | “r” | “R” | “?”	Set Backlight = value/increment/decrement Reset Query	Set backlight brightness to “10” → 0xe0 0x31 0x30 * Need to short JP3 to 3-4 closed for enabling the backlight brightness control. * Apply for inverter control voltage in range of 0~5V.
Backlight On/Off	0xe1, “0” | “1” | ”?”	Backlight Off / Backlight On /Status	“0” – Backlight Off “1” – Backlight On. “?” – Backlight On/Off Query

Table 20 - HE-1600 Other Control

Function	Command	Description	Acknowledge (if enabled)
Auto-setup	0xc3	Start auto-setup of current vmode.	“0” – fail. “1” – successful.
Command availability	0xc4, nn	Check whether a command is available.	“0” – not available. “1” – available.
Auto-calibration	0xc5	Start auto-calibration of gain of the RGB amplifier.	“0” – fail. “1” – successful.
Soft Power On/Off	0xc8, “0” | “1” | “?”	Soft power off/on query	“0” – soft power off. “1” – soft power on.
Query video input status	0xc9	Query the status of the primary & pip status	“nn,nn” = input status “nn,xx” digit = primary status: “0”,”0” : invalid “A”,”1” ARGB “A”, “2” ARGB 2 “B”,”1” Composite “C”,”1” S-video “D”,”1” HD/SD Component “F”,”1” DVI “xx,nn”= PIP input status: “0”,”0”: invalid
Reset to factory defaults	0xce	Reset all parameters to default value	“1” – successful.

n = 1-byte ascii-coded hex number, e.g., parameter value of 0x1 is represented by “1” (0x31).
mn or nn = 2-byte ascii-coded hex number, e.g., parameter value of 0x1e is represented by “1”, “e” | “E” (0x31, 0x6e|0x4e).

HE-1920 Controller Serial Control Functions

The OSD functions are controlled through the following RS-232 commands.

The RS-232 program can be custom-tailored to fit the application or it can be used as provided by Chassis Plans on request. Please contact Chassis Plans for additional information.

Table 21 - HE-1920 Commands to Implement Switch Mount Control Buttons

Function	Command	Description	Remark
Menu button	0xf7	Menu button pressed	Button equivalent
Select-down button	0xfa	Select-down button pressed	Button equivalent
Select-up button	0xfb	Select-up button pressed	Button equivalent
Right/+ button	0xfc	Right/+ button pressed	Button equivalent
Left/- button	0xfd	Left/- button pressed	Button equivalent

Table 22 - HE-1920 Parameter Setting - Immediate, Relative, Reset and Query

Function	Command	Description	Acknowledge (if enabled)
Volume control - left+right channel	0x80, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set audio (L+R) volume = value/increment/decrement Reset Query	volume Range : “0””0”-“1””E” Default : “0””F”
Volume control - on/off (mute)	0x80, “m” | “M”, “0” | “1” | “r” | “R” | “?”	 Disable audio output. Enable audio output. Reset Query	“0” - audio off (muted). “1” - audio on.
Brightness control	0x81, nn | “+” | “-” | “r” | “R” | “?”	Set brightness = value/increment/decrement Reset Query	Brightness. Range : “4””E”-“B””2” Default : “8””0”
Contrast control - all channels	0x82, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set all contrast = value/increment/decrement Reset Query	Contrast Range : “1””C”-“E””4” Default : “8””0”
Saturation control	0x83, nn | “+” | “-” | “r” | “R” | “?”	Set saturation = value/increment/decrement Reset Query	PAL/NTSC color (In video mode only) Range : “0””1”-“F””F” Default : “8””0”
Hue control	0x84, nn | “+” | “-” | “r” | “R” | “?”	Set hue = value/increment/decrement Reset Query	NTSC tint (In NTSC mode only) Range : “5””3”-“9””F” Default : “7””9”

Phase (tuning) control	0x85, nn | “+” | “-” | “?”	Set dot clock phase = value/increment/decrement Query	Dot clock phase. (In PC mode only)
Image H position	0x86, nnnn | “+” | “-” | “?”	Set img_hpos = value/increment/decrement Query	Image horizontal position. (In PC mode only)
Image V position	0x87, nnnn | “+” | “-” | “?”	Set img_vpos = value/increment/decrement Query	Image vertical position. (In PC mode only)
Sharpness	0x8a, nn | “+” | “-” | “r” | “R” | “?”	Set sharpness = value/increment/decrement Reset Query	Sharpness. (Video Mode Source only) Range : “F””1”-“0””F” Default : “0””0”
Frequency	0x8b, nnnn | “+” | “-“ | “?”	Set frequency = Value/increment/decrement Query	Graphic mode H active size (in pixels)
Scaling Mode	0x8c, “0” | “1” | “2” | “3” | “9” | “A” | “B” | “C” | “D” | “r” | “R” | “?”	Set graphic image scaling mode = value Reset Query	Image expansion on/off. “0” – 1:1 “1” – fill screen “2” – fill to aspect ratio “9” – 4:3 “A” – 16:9 “B” – 16:10 “C” – 2.35:1 “D” – 2:1
Set display orientation	0x8e, n | “r” | “R” | “?”	Set display orientation = value/increment/decrement Reset Query	“0” – normal. “1” – vertical inverse. “2” – horizontal inverse. “3” – inverted.
OSD H position	0x90, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_hpos = value/increment/decrement Reset Query	OSD horizontal position. Range : “0””0”-“F””F” Default : “8””0”
OSD V position	0x91, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_vpos = value/increment/decrement Reset Query	OSD vertical position. Range : “0””0”-“F””F” Default : “8””0”

OSD Transparency	0x92, n | “+” | “-” | “r” | “R” | “?”	Set OSD transparency = value/increment/decrement Reset Query	OSD tranparency. “0” – ON “1” - OFF
OSD menu timeout	0x93, nn | “+” | “-” | “r” | “R” | “?”	Select menu timeout = value/increment/decrement Reset Query	OSD menu timeout value. “0””0” – Continuous. value – Round up to nearest available step. if value > max available step, set it to the max available step. Range : “0””5”-“3””C” Default : “0””A”
Select OSD language	0x95, n | “r” | “R” | “?”	Select language = English, Chinese,… Reset Query	“0” – English. “8” – Chinese
Input main select	0x98, nn | “+” | “-” | “r” | “R” | “?”	Select input main = PC or VIDEO or next available Reset Query	Main selected. 0x41, 0x31 : ARGB 0x42, 0x31 : Composite 0x43, 0x31 : S-video 0x44, 0x31 : SD Component 0x45, 0x31 : HDSDI 0x46, 0x31 : DVI 0x47, 0x31 : HD Component 0x42, 0x32 : Composite 2 0x43, 0x32 : S-video 2 0x44, 0x32 : SD Component 2 0x45, 0x32 : HDSDI 2 (Source sequence : S-Video → SD component → HD/SD SDI1 → HD/SD SDI2 → ARGB → DVI → Composite → Composite 2 → S-Video)
Auto Source Seek	0x99, “0” | “1” | “r” | “R” | “?”	Set Auto source seek = OFF/ON Reset Query	“0” – OFF “1” – ON

Video System (Composite, S-video and Component Only)	0x9b, “0” | “1” | “2” | “3” | “r” | “R” | “S” | “s”| “?”	Set video system = Auto/NTSC/PAL/SECAM Reset Video State Query Query	Query “0” – Auto. “1” – NTSC_M_358 “2” – PAL_N_443 “3” – SECAM “4” – NTSC_M_443 “5” - PAL_M_358 “6” – NTSC_N_358 “7” – PAL_M_443 “8” – NTSC_N_443 “9” – PAL_N_358 Video State Query “0” – No video. “1” – NTSC “2” – PAL “3” – SECAM
GAMMA value select	0x9d, n | “r” | “R” “?”	Select GAMMA value = Value Reset Query	GAMMA value: “0” – 1.0, “1” – 1.6 “2” – 2.2 “3” – User Defined
Auto power off	0x9f, “0” | “1” | “r” | “R” | “?”	Set power down option = On/Off Reset Query	“0” – Off. “1” – On.
Hotkey 1	0xa0, “1”, n | “r” | “R” | “?”	Set Hotkey 1= Value Reset Query	“1” – volume. “2” – brightness. “3” – contrast. “4” – color. “5” – input source. “7” – zoom “8” – freeze “9” – PIP “D” – PIPSwap “E” – Aspect “F” – Orientation “G” – Hue “H” – Backlight
Hotkey 2	0xa0, “2”, n | “r” | “R” | “?”	Set Hotkey 2 = value Reset Query	“1” – volume. “2” – brightness. “3” – contrast. “4” – color. “5” – input source. “7” – zoom “8” – freeze “9” – PIP “D” – PIPSwap “E” – Aspect

			“F” – Orientation “G” – Hue “H” – Backlight
Runtime counter	0xa1, nnnnn | “r” | “R” | “?”	runtime counter value = nnnnn (* 0.5 hour) Reset Query	Runtime = nnnnn.
PIP brightness control	0xa2, nn | “+” | “-” | “r” | “R” | “?”	Set PIP window brightness = value/increment/decrement Reset Query	PIP window brightness. Range : “4””E”-“B””2” Default : “8””0”
PIP contrast control	0xa3, nn | “+” | “-” | “r” | “R” | “?”	Set PIP window contrast = value/increment/decrement Reset Query	PIP window contrast. Range : “1””C”-“E””4” Default : “8””0”
PIP H position	0xa4, nnn | “+” | “-” | “r” | “R” | “?”	Set PIP_hpos = value/increment/decrement Reset Query	PIP window horizontal position. Range : “0””0””0”-“0””6””4” Default : “0””5””5”
PIP V position	0xa5, nnn | “+” | “-” | “r” | “R” | “?”	Set PIP_vpos = value/increment/decrement Reset Query	PIP window vertical position. Range : “0””0””0”-“0””6””4” Default : “0””1””4”
PIP window size select	0xa6, nn | “r” | “R” | “?”	Select PIP window size = PIP window size value Reset Query	Main selected. “0””0” - PIP off (Default) “0””1” - PIP small “0””2” - PIP medium “0””3” - PIP large “0””4” - PBP
PIP source select	0xa7, n | “r” | “R” | “?”	Select input main = Video source value Reset Query	Main selected. 0x41, 0x31 : ARGB 0x42, 0x31 : Composite 0x43, 0x31 : S-video 0x44, 0x31 : SD Component 0x45, 0x31 : HDSDI 0x46, 0x31 : DVI 0x47, 0x31 : HD Component 0x42, 0x32 : Composite 2 0x43, 0x32 : S-video 2 0x44, 0x32 : SD Component 2 0x45, 0x32 : HDSDI 2

Zoom level	0xa8, nnnn | “+” | “-” | “r” | “R” | “?”	Set Zoom level = value/increment/decrement Reset Query	Zoom level. Min : 0x30 0x30 0x30 0x30 (Default) Max : 0x30 0x30 0x41 0x33
Zoom H position	0xa9, nnnn | “+” | “-” | “r” | “R” | “?”	Set Zoom_hpos = value/increment/decrement Reset Query	Zoom window horizontal position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution.
Zoom V position	0xaa, nnnn | “+” | “-” | “r” | “R” | “?”	Set Zoom_vpos = value/increment/decrement Reset Query	Zoom window vertical position. Default : 0x30 0x30 0x30 0x30 The min and max values will change depends on input resolution.
Horizontal Size	0xad, nnn | “+” | “-” | “r” | “R” | “?”	Set horizontal size for Aspect Size = value/increment/decrement Reset Query	Scalar horizontal stretch PAL(576i) / NTSC (480i) : Min : 0x30 0x30 0x30 (Default) Max : 0x30 0x46 0x30
Vertical Size	0xb0, nnn | “+” | “-” | “r” | “R” | “?”	Set Vertical Size for Aspect Size = value/increment/decrement Reset Query	Scalar vertical stretch. PAL(576i) / NTSC (480i) : Min : 0x30 0x30 0x30 (Default) Max : 0x30 0x46 0x30
Horizontal Pan	0xb1, nnn | “+” | “-” | “r” | “R” | “?”	Set horizontal pan position for Aspect Size = value/increment/decrement Reset Query	Scalar horizontal pan position PAL(576i) / NTSC (480i) : Assume max H-Size & max V-size : Min : 0x46 0x38 0x38 Max : 0x30 0x37 0x38 Default : 0x30 0x30 0x30 The min and max values will change depends on different value of H-Size, V-Size and input resolution.

Vertical Pan	0xb2, nnn | “+” | “-” | “r” | “R” | “?”	Set Vertical pan position for Aspect Size = value/increment/decrement Reset Query	Scalar vertical pan position PAL(576i) / NTSC (480i) : Assume max H-Size & max V-size : Min : 0x46 0x38 0x38 Max : 0x30 0x37 0x38 Default : 0x30 0x30 0x30 The min and max values will change depends on different value of H-Size, V-Size and input resolution.
Colour temperature select	0xb3, n | “r” | “R” | “?”	Select colour temperature = value Reset Query	Main selected. “0” – 9500K. “1” – 8000K. “2” – 6500K. “3” – 5000K “4” - User
Red level for selected colour temperature	0xb4, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Green level for selected colour temperature	0xb5, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Blue level for selected colour temperature	0xb6, nn | “+” | “-” | “r” | “R” | “?”	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature. Range : “9””C”-“F””F” Default : “E””C”
Graphic horizontal resolution enquiry	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	“nnn” = horizontal resolution
Graphic vertical resolution enquiry	0xb8	Vertical resolution (in lines) in 3 digit hex number	“nnn” = vertical resolution
Graphic horizontal sync frequency enquiry	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	“nnn” = horizontal frequency

Graphic vertical sync frequency enquiry	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number and 1 char	“nnnc” = vertical frequency nnn = 3 digit hex c= “i” or “p” interlace or Progressive 0xba added the interlace(i) or Progressive(p) feedback.
OSD status enquiry	0xbb	Status of OSD	“0” – OSD turned off “1” – OSD turned on
OSD turn off	0xbd	Turn off the OSD.	“1” – successful.
Set gamma data for user defined gamma curve	0xbf, mm, c, “?” 0xbf, “R” | “r” 0xbf, mm, c, nn	Query gamma data for color c index mm (c = 0 for color Red, c=1 for color Green, c=2 for color Blue) Set user gamma curve to linear Set gamma data for color c index mm. (If c= 3, then gamma data for red, green & blue will be set at the same time.)	“nn” = gamma data “1” “nn” = gamma data
Backlight control	0xe0, nn | “+” | “-” | “R” | “r” | “?”	Set Backlight = value/increment/decrement Reset Query	Backlight. Range: D/A : “0””0” ~ “1””6” 100Hz : “0””0” ~ “8””A” 120Hz : “0””0” ~ “7””3” 140Hz : “0””0” ~ “6””3” 160Hz : “0””0” ~ “5””6” 180Hz : “0””0” ~ “4””D” 200Hz : “0””0” ~ “4””5” 220Hz : “0””0” ~ “3””E” 240Hz : “0””0” ~ “3””9” 260Hz : “0””0” ~ “3””5” 280Hz : “0””0” ~ “3””1” 300Hz : “0””0” ~ “2””E” 320Hz : “0””0” ~ “2””B” 340Hz : “0””0” ~ “2””8” 360Hz : “0””0” ~ “2””6” 380Hz : “0””0” ~ “2””4” 400Hz : “0””0” ~ “2””2” 420Hz : “0””0” ~ “2””0” 440Hz : “0””0” ~ “1””F”
Backlight On/Off	0xe1, “0” | “1” | “R” | “r” ”?” “S” | “s”	Backlight Off / Backlight On /Status	“0” – Backlight Off “1” – Backlight On. “?” – Backlight On/Off Query “S”|”s” – Backlight Status Query

Color Monochrome mode selection (Output Channel Select)	0xe2 “0” | “1” | “2” | “3” | | “4” | “5” | “6” | “R” | “r”| ”?”	Off/ Blue Only/ Red Only/ Green Only/ Blue Mono/ Red Mono/ GreenMono/	“0” – Off “1” – Blue Only “2” – Red Only “3” – Green Only “4” – Blue Mono “5” – Red Mono “6” – Green Mono
PIP Swap	0xe3	Swap Main and PIP source	"0" - Fail. "1" - Successful.
Backlight D/A / PWM	0xe5 “0” | “1” | “R” | “r” ”?”	Set : PWM or D/A Reset Query	“0” – PWM “1” – D/A
Backlight PWM Frequency	0xe6, nnn | “+” | “-” | “R” | “r” | “?”	Set Backlight PWM Frequency = value/increment/decrement Reset Query	+/- 20Hz Value 100Hz : “0”,”6”,”4” 120Hz : “0”,”7”,”8” 140Hz : “0”,”8”,”C” 160Hz : “0”,”A”,”0” 180Hz : “0”,”B”,”4”’ 200Hz : “0”,”C”,”8” 220Hz : “0”,”D”,”C” 240Hz : “0”,”F”,”0” 260Hz : “1”,”0”,”4” 280Hz : “1”,”1”,”8” 300Hz : “1”,”2”,”C” 320Hz : “1”,”4”,”0” 340Hz : “1”,”5”,”4” 360Hz : “1”,”6”,”8” 380Hz : “1”,”7”,”C” 400Hz : “1”,”9”,”0” 420Hz : “1”,”A”,”4” 440Hz : “1”,”B”,”8”
Backlight Invert	0xe7 “0” | “1” | “R” | “r” ”?”	Set On or Off Reset Query	“0” – Off “1” – On
Red Offset for selected colour temperature	0xe8, nn | “+” | “-” | “r” | “R” | “?”	Set the Offset of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red Offset for selected colour temperature.

Green Offset for selected colour temperature	0xe9, nn | “+” | “-” | “r” | “R” | “?”	Set the Offset of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green Offset for selected colour temperature.
Blue Offset for selected colour temperature	0xea, nn | “+” | “-” | “r” | “R” | “?”	Set the Offset of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue Offset for selected colour temperature.
PIP Window Auto Off	“0xee”, “0x41” “0” |”1” “?”	Auto Off / Auto On Query	“0”- Off “1”- On
Custom Sizing	0xef, “0” | “1” | “2” ”?”	Custom sizing selection : Overscan / Normal / Custom Query	“0” – Overscan “1” – Custom “2” – Normal

Table 23 - HE-1920 Other Control

Function	Command	Description	Acknowledge (if enabled)
Select RS-232 acknowledge	0xc1, “0” | “1”	Disable/enable command acknowledge.	“0” – acknowledge disabled. “1” – acknowledge enabled.
Auto-setup	0xc3	Start auto-setup of current vmode.	“0” – fail. “1” – successful.
Command availability	0xc4, n	Check whether a command is available.	“0” – not available. “1” – available.
Auto-calibration	0xc5	Start auto-calibration of gain of the RGB amplifier.	“0” – fail. “1” – successful.
Freeze frame	0xc6, “0” | “1”	Unfreeze / freeze frame	“0” – unfreeze. “1” – freeze.
Soft Power On/Off	0xc8, “0” | “1” | “?”	Soft power off/on query	“0” – Turn off the LCD power and backlight. Turn off memory controller, Power down DVI Power down ADC, Power down Fclk PLL “1” – Turn on the unit
Query video input status	0xc9	Query the status of the primary & pip status	“nn,nn” = input status “nn,xx” digit = primary status: “0”,”0” : invalid “A”,”1” ARGB “B”,”1” Composite “B”,”2” Composite2 “C”,”1” S-video “C”,”2” S-video2 “D”,”1” SD Component “D”,”2” SD Component2 “E”,”1” HDSDI “E”,”2” HDSDI2 “F”,”1” DVI “xx,nn”= PIP input status: “0”,”0”: invalid “A”,”1” ARGB “B”,”1” Composite “B”,”2” Composite2 “C”,”1” S-video “C”,”2” S-video2 “D”,”1” SD Component “D”,”2” SD Component2 “E”,”1” HDSDI “E”,”2” HDSDI2 “F”,”1” DVI

Video de-interlace method	0xca, “0” | “1” “r” | “R” “?”	De-interlace mode Reset Query	“3” ”1”- enable AFM “3” ”0”- disable AFM “4” ”1”- enable TNR “4” ”0”- disable TNR “5” ”1”- enable MADI “5” ”0”- disable MADI “6” ”1”- enable LADI “6” ”0”- disable LADI
Query BIOS version	0xcb, “0”	Read BIOS version	BIOS version “VV.YY.ZZ” VV = V0 or E0, V0 = Release version E0 = Engineering Sample YY= Version Number ZZ= Customer Number
Query PCBA number	0xcb, “1”	Read PCBA number	“nnnnn” = PCBA number SVH-1920= “41696”
Reset parameter	0xce	Reset all parameters to default value	“1” – successful.
Wide Screen Mode Selection	0xd9, “0” | “1”| “2” “r” | “R” “?”	 Wide Screen Mode Reset Query	“0” – Normal Mode “1” – 1280x768 “2” – 1366x768

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
0x30	0	0x41	A	0x61	a	0x2B	+
0x31	1	0x42	B	0x62	b	0x2D	-
0x32	2	0x43	C	0x63	c	0x3F	?
0x33	3	0x44	D	0x64	d		
0x34	4	0x45	E	0x65	e		
0x35	5	0x46	F	0x66	f		
0x36	6	0x47	G	0x67	g		
0x37	7	0x48	H	0x68	h		
0x38	8	0x49	I	0x69	i		
0x39	9	0x4A	J	0x6A	j		
		0x4B	K	0x6B	k		
		0x4C	L	0x6C	l		
		0x4D	M	0x6D	m		
		0x4E	N	0x6E	n		
		0x4F	O	0x6F	o		
		0x50	P	0x70	p		
		0x51	Q	0x71	q		
		0x52	R	0x72	r		
		0x53	S	0x73	s		
		0x54	T	0x74	t		
		0x55	U	0x75	u		
		0x56	V	0x76	v		
		0x57	W	0x77	w		
		0x58	X	0x78	x		
		0x59	Y	0x79	y		
		0x5A	Z	0x7A	z		

Table 24 - Hex to ASCII Conversion Table

Appendix B – Auto Color Gain

The Auto Color Gain function is supported in the ARGB mode only and is designed to calibrate the controller to the incoming video signal. In order to calibrate correctly, the display must be displaying an image containing both black and white data (see illustration below) when the function is used. The internal processor of the video controller chip will then execute a process to adjust the relative values of the RGB signals to achieve the best performance. The parameters of the corrected RGB values are then stored in the controller and are unaffected by the Reset Factory Defaults function.

Image B-1 – Auto Color Gain Example

Warning - If the Auto Color Gain is executed without an appropriate image being displayed, then the process will set incorrect values and the display colors will be distorted. If this occurs, then it can either be corrected by performing the process correctly or if this is not possible then the Reset Color Gain function can be used. This function will reset the stored RGB values to a set of approximate values.

Appendix C – DVI-D versus DVI-I Connectors

The Digital Visual Interface (DVI) is a video interface standard designed to provide very high visual quality on digital display devices such as flat panel LCD computer displays and digital projectors. It was developed by an industry consortium, the Digital Display Working Group (DDWG). It is designed for carrying uncompressed digital video data to a display. It is partially compatible with the High-Definition Multimedia Interface (HDMI) standard in digital mode (DVI-D), and VGA in analog mode (DVI-A).

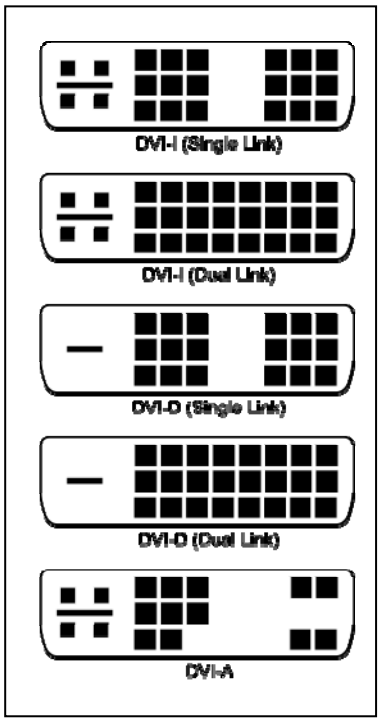
The LCD controllers offered with the CCX keyboards offer DVI-D and DVI-I, depending on which controller is selected. This discussion is presented to help clarify the difference between the various flavors of DVI.

Overview

The DVI interface uses a digital protocol in which the desired illumination of pixels is transmitted as binary data. When the display is driven at its native resolution, it will read each number and apply that brightness to the appropriate pixel. In this way, each pixel in the output buffer of the source device corresponds directly to one pixel in the display device, whereas with an analog signal the appearance of each pixel may be affected by its adjacent pixels as well as by electrical noise and other forms of analog distortion.

Connectors

The DVI connector usually contains pins to pass the DVI-native digital video signals. In the case of dual-link systems, additional pins are provided for the second set of data signals.



As well as digital signals, the DVI connector includes pins providing the same analog signals found on a VGA connector, allowing a VGA monitor to be connected with a simple plug adapter. This feature was included in order to make DVI universal, as it allows either type of monitor (analog or digital) to be operated from the same connector.

The DVI connector on a device is therefore given one of four names, depending on which signals it implements:

DVI-D (digital only)
DVI-I (integrated, digital & analog)

The connector also includes provision for a second data link for high resolution displays, though many devices do not implement this. In those that do, the connector is sometimes referred to as DVI-DL (dual link).

The long flat pin on a DVI-I connector is wider than the same pin on a DVI-D connector, so it is not possible to connect a male DVI-I to a female DVI-D by removing the 4 analog pins. It is possible, however, to connect a male DVI-D cable to a female DVI-I connector. Many flat panel LCD monitors have only the DVI-D connection so that a DVI-D male to DVI-D male cable will suffice when connecting the monitor to a computer's DVI-I female connector.

Essentially, DVI-D is the same as DVI-I with DVI-D missing the analog portion of the signals. A DVI-D connector and monitor can connect to a DVI-I output and function. A DVI-I monitor can connect to a DVI-D output with the caveat that no analog video will be available.